DRAFT

Framework 27 to the Scallop FMP

Including a Draft Environmental Assessment (EA), an Initial Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE Report)

Initial Council Meeting: June 16-18, 2015
Final Council Meeting: December 1-3, 2015
Submission of Decision Document: December 22, 2015
Submission of Preliminary EA: January 27, 2016
Submission of Final EA:

Intentionally Blank

Executive Summary

This framework and Environmental Assessment (EA) presents and evaluates management measures and alternatives to achieve specific goals and objectives for the Atlantic sea scallop fishery. This document was prepared by the New England Fishery Management Council and its Scallop Plan Development Team (PDT) in consultation with the National Marine Fisheries Service (NMFS, NOAA Fisheries) and the Mid-Atlantic Fishery Management Council (MAFMC). This framework was developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, M-S Act) and the National Environmental Policy Act (NEPA), the former being the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ). This document also addresses the requirements of other applicable laws (See Section 6.0).

The primary purpose of this action is to set scallop fishery specifications for the 2016 fishing year, as well as default measures for FY2017. This action is needed to achieve the objectives of the Atlantic Sea Scallop Fishery Management Plan (FMP), which is to prevent overfishing and improve yield-per-recruit from the fishery. In addition to the No Action alternative, the Council considered various other alternatives to address the purpose and need of this action. A summary of the alternatives considered, and the rationale for the Council preferred alternatives are summarized in Table 1; **the preferred alternatives are in bold**. Figure 1 shows the spatial management boundaries with areas open and closed to the fishery for FY2016 based on the preferred alternatives in this action.

The preferred alternative includes an Acceptable Biological Catch (ABC) which was calculated using the same method as in Framework 26, with updated data. The Scientific and Statistical Committee (SSC) recommended an acceptable biological catch of 55,737 mt in both 2016 and 2017 (default), which includes discards and incidental mortality as well as landings.

Fishery specifications for 2016 and default measures for 2017 are included in this action for both limited access and limited access general category vessels. The final Council preferred alternative includes Alternative 3 with a few modifications (Alternative 3a). First, access area trips originally planned for limited access (LA) scallop vessels in Closed Area II would be shifted to the Mid-Atlantic Access Area (Alternative 2.2.3.1). Therefore, the only area open to LA vessels under the preferred alternative would be the Mid-Atlantic access area. Second, limited access general category scallop (LAGC) vessels would be allocated a relatively small amount of access in the northern part of Nantucket Lightship. The equivalent of 19% of all access area effort for LAGC vessels would be available in Nantucket Lightship-north, and the remainder would be available in the Mid-Atlantic Access Area (Alternative 2.2.3.2.3).

Under the preferred alternative, the total projected catch is about 47 million pounds, including a maximum of about 4.47 million pounds for LAGC IFQ vessels, and the remaining catch is for the limited access fishery as well as various set-asides for incidental permits, the research set-aside (RSA) program and the observer set-aside program. The limited access fishery specifications include 34.55 open area days-at-sea (DAS) for full-time limited access vessels and 13.82 for part-time vessels. Full-time limited access vessels will be allocated 51,000 pounds in access area catch and part-time vessels will be allocated 20,400 pounds. The proposed action

includes a "flexible allocation" for Mid-Atlantic access areas. This means that each vessel can fish allocated catch in any of the Mid-Atlantic access areas, except for the inshore portion of the Elephant Trunk that will remain closed to protect small scallops in that area. The preferred alternative also includes a new closure south of Closed Area II currently in open areas to protect small scallops that have been observed in that area (Figure 4). Under the preferred alternative, all three access areas on Georges Bank will remain closed to the LA scallop fishery: Closed Area II, Closed Area I, and Nantucket Lightship.

For limited access general category (LAGC) vessels the total allocation is set at 5.5% of the total ACL available to the fishery in FY2016, or about 4.47 million pounds. Individual vessels will be allocated a specific poundage or quota based on their individual contribution factor plus or minus any quota they have permanently or temporarily leased. The preferred alternative includes an allocation of about 2,500 LAGC trips in access areas. This allocation is equivalent to the same proportion of access LA vessels have in access areas compared to open areas (34% of total projected catch for 2016 is projected to come from access areas). Applying that proportion to the total LAGC allocation of 4.47 million pounds comes out to about 1.5 million pounds, or 2,553 trips at 600 pounds per trip. This action maintains the LAGC Northern Gulf of Maine (NGOM) hard TAC at 70,000 pounds and the target TAC for LAGC vessels with incidental catch permits at 50,000 pounds. An estimate of catch from state waters has been updated to 622,312 pounds per year in this action as well; it is based on an updated three-year average from 2012-2014.

This action also includes default measures for FY2017. Default measures for LA vessels include DAS allocations of 33.75 for full-time LA vessels, which is equivalent to 75% of projected DAS for FY2017 (45 DAS), and the equivalent of one access area trip for LA vessels (17,000 pounds for full-time vessels and 10,200 for part-time vessels) that can be fished in the Mid-Atlantic access area starting April 1, 2017. The default LAGC IFQ allocation is equivalent to 2016 levels, about 4.47 million pounds, including some access in the Mid-Atlantic access areas, equivalent to 851 trips starting on April 1, 2017. These default measures were developed to be in place until a subsequent action would implement final allocations for FY2017. Lastly, the same TACs for NGOM and incidental catch permits are included in the proposed action for 2017 (default).

Finally, the preferred alternative includes a prohibition on fishing RSA compensation from Nantucket Lightship north in FY2016. While that area will be open to some LAGC effort (a maximum of 300,000 pounds, the Council decided to prohibit RSA compensation fishing in that area to minimize impacts on small scallops in that area. The total RSA set-aside is equivalent to 1.5 million pounds, and the preference is to harvest that allocation from other areas open to the fishery (open areas and the Mid-Atlantic access area).

The environmental impacts of all of the alternatives considered are described in Section 5.0 and summaries of the most substantial impacts are provided here. A summary of the Council rationale for each measure is described in Table 1. The preferred alternative for fishery specifications is expected to have positive impacts on the scallop resource and fishery. The allocations are expected to prevent overfishing and maintain high total biomass as well as higher landings, revenues, and net economic benefits compared to No Action since it has lower access levels. Impacts on EFH, non-target species and protected resources are expected to be low

negative compared to No Action, but neutral compared to recent fishing levels since total area swept estimates are similar. Some additional measures are preferred to reduce impacts on small scallops including a new closure, maintaining two existing closures, and prohibiting scallop research set-aside (RSA) catch from the Nantucket Lightship access area. The preferred alternative includes a new closure south of Closed Area II where small scallops have been observed for two years. In addition, this action maintains the current closures that were adopted in 2015 to protect small scallops, the expansion of Nantucket Lightship to the west and the closure within the Elephant Trunk Access Area.

Finally, research set-aside can typically be harvested from any area open to the fishery, but in this instance only a relatively small amount of access is being recommended from the northern part of Nantucket Lightship. Allowing additional removals from research set-aside, up to 1.25 million pounds overall, could have negative impacts on the small scallops in that area. Therefore, the Council recommends that RSA compensation fishing be limited to open areas and the Mid-Atlantic Access Area only.

The environmental impacts of all of the alternatives considered are described in Section 5.0 and summaries of the most substantial impacts are provided here. The preferred alternative for fishery specifications is expected to have positive impacts on the scallop resource and fishery. The allocations are expected to prevent overfishing and maintain high total biomass as well as higher landings, revenues, and net economic benefits compared to No Action since it has lower access levels. The aggregate economic impacts of the preferred specifications on net economic benefits are expected to be positive in the short-term compared both to the No Action and Status Quo levels. Under the preferred alternative scallop landings in 2016 are estimated to increase to about 46.9 million pounds, about $538.7 million in revenues, and total economic benefits of $526.9 million, higher than the actual levels in 2015.

Impacts of the preferred specifications on EFH, non-target species and protected resources are expected to be low negative compared to No Action, but low positive compared to recent fishing levels since total area swept estimates are lower than recent years. Some additional measures were included in the preferred alternative to reduce impacts on small scallops including a new closure south of Closed Area II, continuation of closures within Elephant Trunk and an extension to the east of Nantucket Lightship, as well as a prohibition on harvesting scallop research set-aside catch from the Nantucket Lightship access area. All of these measures are expected to have beneficial impacts on the scallop resource by reducing incidental and discard mortality of juvenile scallops. The economic impacts of these measures are positive in the long term if overall yield is higher from reduced incidental and discard mortality.

The preferred alternative includes some access in the northern part of Nantucket Lightship for limited access general category vessels only, a total of about 300,000 pounds. The overall impacts on the resource from this relatively small amount of access are expected to be minor, and the majority of juvenile biomass observed within Nantucket Lightship would still be protected in closed areas, thus the preferred alternative is expected to promote conservation. Any potential negative impacts on the resource from this access are expected to be outweighed by positive economic benefits for LAGC vessels not likely to fish and benefit from the Mid-Atlantic Access Area. In general, LAGC vessels are typically smaller and less powerful than LA

vessels; therefore, their ability to fish in areas farther from their homeport is more limited. Overall, providing a relatively small amount access in NL-north provides some opportunity for more LAGC vessels to participate in the access area program, compared to other alternatives that only provide access in MAAA that would provide more opportunity for fewer LAGC vessels primarily homeported near the MAAA. The preferred alternative is expected to spread those benefits across more LAGC vessels and fishing communities.

Providing access to LAGC vessels in NL-north and not LA vessels could have differential impacts among these fisheries by allowing one segment of the fishery in an area before the other. However, the Council discussed that the large scale area rotation system was primarily designed to manage the directed limited access fishery and can in some cases disadvantage smaller vessels that fish in more localized areas. Therefore, in this particular case the Council supported allowing a relatively small amount of catch from NL-north for LAGC vessels only to acknowledge that different segments of the fishery have different needs and constraints. The preferred alternative is expected to help maintain a diverse and flexible small scale scallop fishery and provide "dayboat" product in more fishing communities than other alternatives considered.

Overall, the cumulative effects of the preferred alternative on the scallop resource, EFH, protected resources, fishery businesses and communities, other fisheries and non-target species should result in non-significant neutral to low positive impacts.

Table 1 – Summary of Framework 27 preferred alternatives, other measures, and Council rationale for preferred alternatives

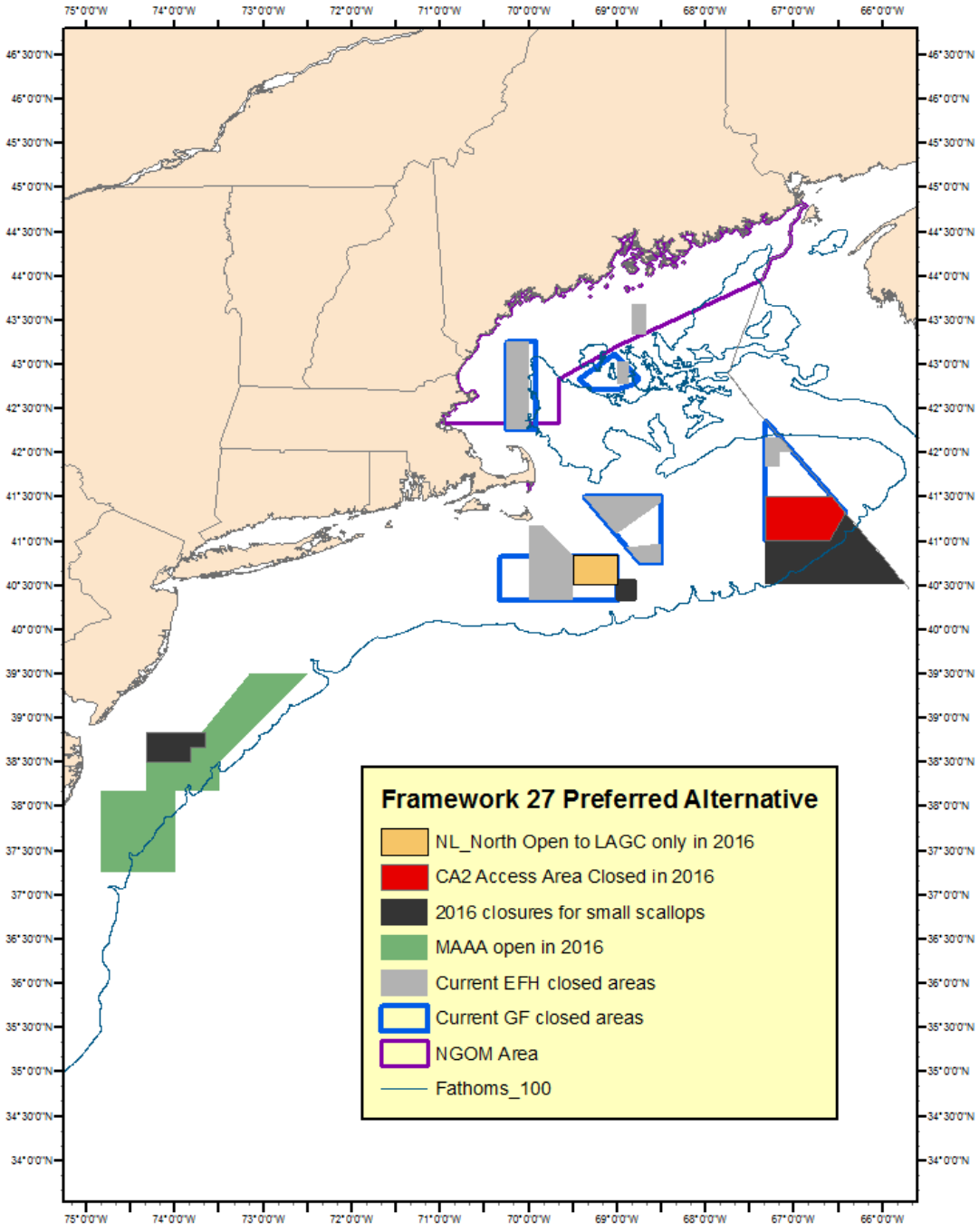
	FW27 Alternatives	Council Preferred
2.1	OFL and ABC	The Council recommends the updated OFL/ABC values as preferred because they are based on the most updated estimates of scallop biomass and are recommended by the SSC. Setting OFL and ABC on the best available data should prevent overfishing compared to using outdated information. The estimate of scallop biomass is based on annual surveys, and in some cases multiple surveys are conducted in more critical areas.
	2.1.1 No Action OFL and ABC (45,456mt and 37,903 mt)	
	2.1.2 Updated OFL and ABC (68,418mt and 55,737mt)	
2.2.1	Overall Fishery Specificatoins	The Council recommends Alternative 3a as preferred (Section 2.2.3.1 and Figure 1). This alternative protects high concentrations of small scallops observed south of Closed Area II by closing a new area that is currently open to the fishery. This alternative also maintains the current closed area within Elephant Trunk (ETA), which also has high concentrations of small scallops. The Council does not recommend extending the ETA closed area because the current closure has the vast majority of the projected juvenile scallop biomass within ETA (75%) and expanding the closure would leave less area for the fleet to fish within the Mid-Atlantic Access Area (MAAA). The preferred alternative also allocates fewer DAS to the limited access fishery than other alternatives, which should have beneficial imapcts on the resource in open areas. The preferred alternative also includes some access in the northern part of the NL access area for LAGC IFQ vessels only (See Section 2.2.3.2 for that measure). Overall the biological and economic impacts of the alternatives considered are similar. The preferred alternative projects landings at 46.9 million pounds, $538.7 million in revenues, and $526.9 million total economic benefits in 2016. The preferred alternative has slightly lower short-term total economic benefits both in 2016 and over the long-term compared to other alternatives except for the no action alternative. This is because, size composition under the preferred alternative includes slightly less U10s compared to other alternatives. The Council clarified the 2017 default measures include some access in the Mid-Atlantic access areas. Access is set lower than projections (17,000 pounds per full-time vessel) and would not be available until April 1 to maximize yield.
	Alternative 1 No Action (2016 default)	
	Alternative 2 Basic Run	
	Alternative 3 Basic Run with CA2south extension	
	Alternative 3a (CA2 remains closed)	
	Alternative 4 Basic Run with ETA extension	
	Alternative 5 Basic Run with NL-N access	
	Default measures for 2017	

	FW27 Alternatives	Council Preferred
2.2.2	Allocation method for LA access areas	Option 1 and 2 were developed if a lottery was needed to allocate FT LA trips. However, since the final preferred alternative only includes access in one area (MAAA) a lottery is not necessary. Therefore, the Council did not take action on this section (No Action - no lottery).
	2.2.2.1 No Action (No Lottery - equal access p	
	2.2.2.2 Lottery Option 1 (no NL access)	
	2.2.2.3 Lottery Option 2 (with NL access)	
2.2.3	Allocation of LAGC IFQ trips in AAs	
	2.2.3.1 LAGC AA Allocations (total number of fleet	The preferred alternative is Option 2. The rationale for this alternative is that it would provide about the same level of access for LA and LAGC vessels in access areas in 2016 in terms of the total proportion of catch (about 34% of total catch from access areas). When 34% is applied to the total LAGC sub-ACL (4.47M), about 1.5 million pounds would be available from access areas, equivalent to 2,553 trips. This alternative increases the total level of access to higher catch rate areas for LAGC vessels compared to other alternatives considered. Positive impacts are expected from spreading effort out and providing access to higher density areas. In particular, in 2016 the total LAGC IFQ has increased to 4.47 million pounds, and if more of that total allocation is available in access areas, less effort would be available in open areas, which are projected to have lower catch rates than access areas. It was discussed that this higher level of access is warranted in this case due to the relatively high overall allocations and the fact that open areas have relatively low catch rates, thus this alternative would provide the most positive economic benefits for LAGC vessels compared to the other alternatives considered.
	2.2.3.1.1 Allocation Option 1 - No Action - Default of 602 Trips starting in April	
	2.2.3.1.2 Allocation Option 2-2,553 trips (same AA proportion as LA - 34%)	
	2.2.3.1.3 Allocation Option 3-1,523 trips (equal to overall allocation of 5.5%)	
	2.2.3.1.4 Allocation Option 4 - Status Quo - 2,065 trips (same # as FY2015)	

FW27 Alternatives	Council Preferred
2.2.3.2 LAGC AA Allocations (by area)	The preferred alternative is Area Option 3 - some access in NL-north for LAGC vessels. The maximum removal from that area is recommended at about 300,000 pounds or 485 trips. The primary rationale for this alternative is to provide opportunities for more LAGC vessels throughout the region to have access in areas with higher catch rates compared to open areas, but restrict the total level of access so that it does not have measurable biological impacts on the small scallops in that area. Based on the biological and economic projections, both the short and long term impacts of this alternative (Alternative 3a - with NL access) compared to no NL access (Alternative 3) are minimal, and similar to each other. The Council discussed that the areas with the highest concentrations of small scallops observed on Georges Bank in 2015 would still be closed to all scallop fishing - specifically the southern part of the NL access area and the EFH closed area in NL. Under the proposed action those areas would remain closed to all scallop gear; therefore risks of negative impacts on the high recruitment in the general region are minimized overall. The Council discussed that this alternative recognizes the fact that the large scale area rotation system used for the overall Scallop FMP can in some cases disadvantage small vessels that typically fish in more localized areas. Therefore, in this particular case the Council supports allowing limited access in NL-north for LAGC vessels only to acknowledge that different segments of the overall fishery have different needs and constraints. The area rotation system has proven it is able to prevent overfishing and maintain relatively stable catches overall, but in this year, as well as in 2015, concerns were raised that the nearshore areas are experiencing lower catch rates compared to access areas; therefore, this alternative provides access to more productive areas for a larger group of LAGC vessels. In 2016 the overall allocation to LAGC vessels is higher than it was in 2015 by about 50%. Providing some access in NL-north will likely spread some of the LAGC effort out to more areas, which could have positive impacts on the nearshore areas on GB. Some of those benefits could be outweighed by increased fishing in nearshore areas in the Mid-Atlantic from lower MAAA allocations, but overall the preferred alternative provides some opportunity to more LAGC vessels, compared to more opportunity for fewer LAGC vessels. Amendment 11 established a limited entry program for the general category fishery and developed a vision statement for that segment of the fishery. This measure supports that vision statement because providing some access in a high density area on GB is expected to help maintain the diverse nature and flexibility throughout the LAGC fleet. Providing this access is expected to have beneficial impacts on more LAGC vessels, in particular on smaller vessels homeported in coastal communities in northern ports that are not likely to travel to access areas in the Mid-Atlantic. About 40% of the vessels are homeported in New England and generally, they are smaller than the ones from Mid-Atlantic in terms of horsepower, gross tonnage and length. This alternative may help provide dayboat product to scallop markets in a wider area compared to the other alternatives that would only have access in MAAA. It is not practical for LAGC vessels to fish with a 600 pound possession limit in MAAA and return to homeports in the north. Allowing these vessels to take some of their trips in the NLS access area will help to increase incomes for the vessel owners and the crew by lowering trip costs compared to fishing in access areas of Mid-Atlantic. In addition, if the scallops landed from the NLS access area are larger in size, the prices and revenues will be higher as well. LAGC vessels would still have the ability to lease quota throughout the region if fishing conditions are not as favorable in their area, but providing some access to high density areas on GB as well as the Mid-Atlantic could help maintain fresher product in smaller coastal communities throughout the region. In summary, the proposed action may benefit the scallop resource by spreading out LAGC fishing effort to include a portion of the NLCA. It is not expected to have adverse effects on small scallops that have been identified by surveys in the NLCA, as the access area does not include the areas with the more dense concentrations of small scallops. LAGC vessels in New England may benefit from increased access to scallops in the access area. Consumers and dealers in New England states will benefit from the increased availability of day-boat scallops.
2.2.3.2.1 Area Option 1 (no NL access) All trips in MAAA	
2.2.3.2.2 Area Option 2 (with NL access) Allocate 12% of all LAGC access area trips from NL-north	
2.2.3.2.3 Area Option 3 (with NL access) Allocate 19% of all LAGC access area trips from NL-north	

FW27 Alternatives		Council Preferred
2.2.4	Additional measures to reduce impacts on small scallops	The preferred alternative is Alternative 3 (Section 2.2.4) - prohibit RSA compensation fishing in Nantucket Lightship. In general, vessels that are awarded pounds for research set-aside fishing are allowed to harvest that catch in any area open to the fishery in a particular year. However, in this case there is only very limited access allowed in NL-North for the LAGC fishery only (0.3 million pounds total). The set-aside for research is 1.25 million pounds and it was discussed that a large fraction of that allocation could be used in Nantucket Lightship and that could have negative impacts on the small scallops in that area.
	2.2.4.1 Alt.1 - No Action (Default - RSA in open areas only)	
	2.2.4.2 Alt.2 - Status Quo (RSA in any area open to fishery)	
	2.2.4.3 Alt.3 - Prohibit RSA comp fishing in NL	

Figure 1 – Spatial management under the preferred alternative for Framework 27 (FY2016)



*Note: This figure updated with corrected boundaries for the NL north area using original coordinates provided in **Table 12** of Decision Draft.*

Table of Contents

Table of Tables

Table of Figures

Appendices

1.0 BACKGROUND AND PURPOSE

1.1 BACKGROUND

This framework to the Scallop Fishery Management Plan (FMP) sets fishery specifications for fishing year (FY) 2016 and default measures for FY 2017. The New England Fishery Management (Council) decided to develop a one-year action only, including default measures for Year 2 only (FY2017). This decision was made to set specifications for one year since another action, the EFH Omnibus Amendment, is considering changes to closed areas that may or may not have impacts on scallop fishery specifications in the future.

The list of measures required to be in a framework has increased over the years to include overall annual catch limits, specific allocations for both limited access (LA) and limited access general category (LAGC) vessels. Below is a list of the measures required as part of the scallop fishery specifications:

- Overfishing Limit (OFL) and Acceptable Biological Catch (ABC), which is approved by the SSC;
- Annual Catch Limits (ACL) (for both the limited access and limited access general category fisheries, and Annual Catch Target (ACT) for the LA fishery;
- Allocations for limited access vessels include DAS allocations, access area allocations with associated possession limits;
- Allocations for limited access general category vessels include an overall IFQ for both permit types, as well as a fleetwide, area-specific maximum number of access area trips available for the general category fishery;
- NGOM hard-TAC;
- Incidental catch target-TAC; and
- Set-aside of scallop catch for the industry funded observer program and research set-aside program.

The Council did not include any other measures for consideration; this action includes fishery specifications only.

1.2 PURPOSE AND NEED

The need for this action is to achieve the objectives of the Atlantic Sea Scallop FMP to prevent overfishing and optimize yield by improving yield-per-recruit from the fishery. The primary purpose for this action is to set specifications including: OFL, ABC, scallop fishery ACLs and ACTs including associated set-asides, day-at-sea (DAS) allocations, general category fishery allocations, and area rotation schedule and allocations for the 2016 fishing year, as well as default measures for FY2017 that are expected to be replaced by a subsequent action.

Table 2 – Summary of the purpose and need for measures developed in Framework 27 including section number with specific alternatives

Need	Purpose	Section
To achieve the objectives of the Scallop FMP to prevent overfishing and improve yield-per-recruit from the fishery	To set specifications for FY2015 and FY2016 (default): OFL, ABC, ACLs, LA ACT, DAS, general category allocations, and area rotation schedule and related allocations.	2.2

1.3 SUMMARY OF SCALLOP FISHERY MANAGEMENT PLAN

1.3.1 Summary of past actions

The Atlantic Sea Scallop FMP management unit consists of the sea scallop *Placopecten magellanicus* (Gmelin) resource throughout its range in waters under the jurisdiction of the United States. This includes all populations of sea scallops from the shoreline to the outer boundary of the Exclusive Economic Zone (EEZ). While fishing for sea scallops within state waters is not subject to regulation under the FMP except for vessels that hold a federal permit when fishing in state waters, the scallops in state waters are included in the overall management unit. The principal resource areas are the Northeast Peak of Georges Bank, westward to the Great South Channel, and southward along the continental shelf of the Mid-Atlantic.

The Council established the Scallop FMP in 1982. A number of Amendments and Framework Adjustments have been implemented since that time to adjust the original plan, and some Amendments and Framework Adjustments in other plans have impacted the fishery. This section will briefly summarize the major actions that have been taken to shape the current scallop resource and fishery, but a complete list of the measures as well as the actions themselves are available on the NEFMC website (http://www.nefmc.org/scallops/index.html).

Amendment 4 was implemented in 1994 and introduced major changes in scallop management, including a limited access program to stop the influx of new vessels. Qualifying vessels were assigned different day-at-sea (DAS) limits according to which permit category they qualified for: full-time, part-time or occasional. Some of the more notable measures included new gear regulations to improve size selection and reduce bycatch, a vessel monitoring system to track a vessel's fishing effort, and an open access general category scallop permit was created for vessels that did not qualify for a limited access permit. Also in 1994, Amendment 5 to the Northeast Multispecies FMP closed large areas on Georges Bank to scallop fishing over concerns of finfish bycatch and disruption of spawning aggregations (Closed Area I, Closed Area II, and the Nantucket Lightship Area - See Figure 1).

In 1998, the Council developed Amendment 7 to the Scallop FMP, which was needed to change the overfishing definition, the day-at-sea schedule, and measures to meet new lower mortality targets to comply with new requirement under the Magnuson-Stevens Act. In addition, Amendment 7 established two new scallop closed areas (Hudson Canyon and VA/NC Areas) in the Mid-Atlantic to protect concentrations of small scallops until they reached a larger size.

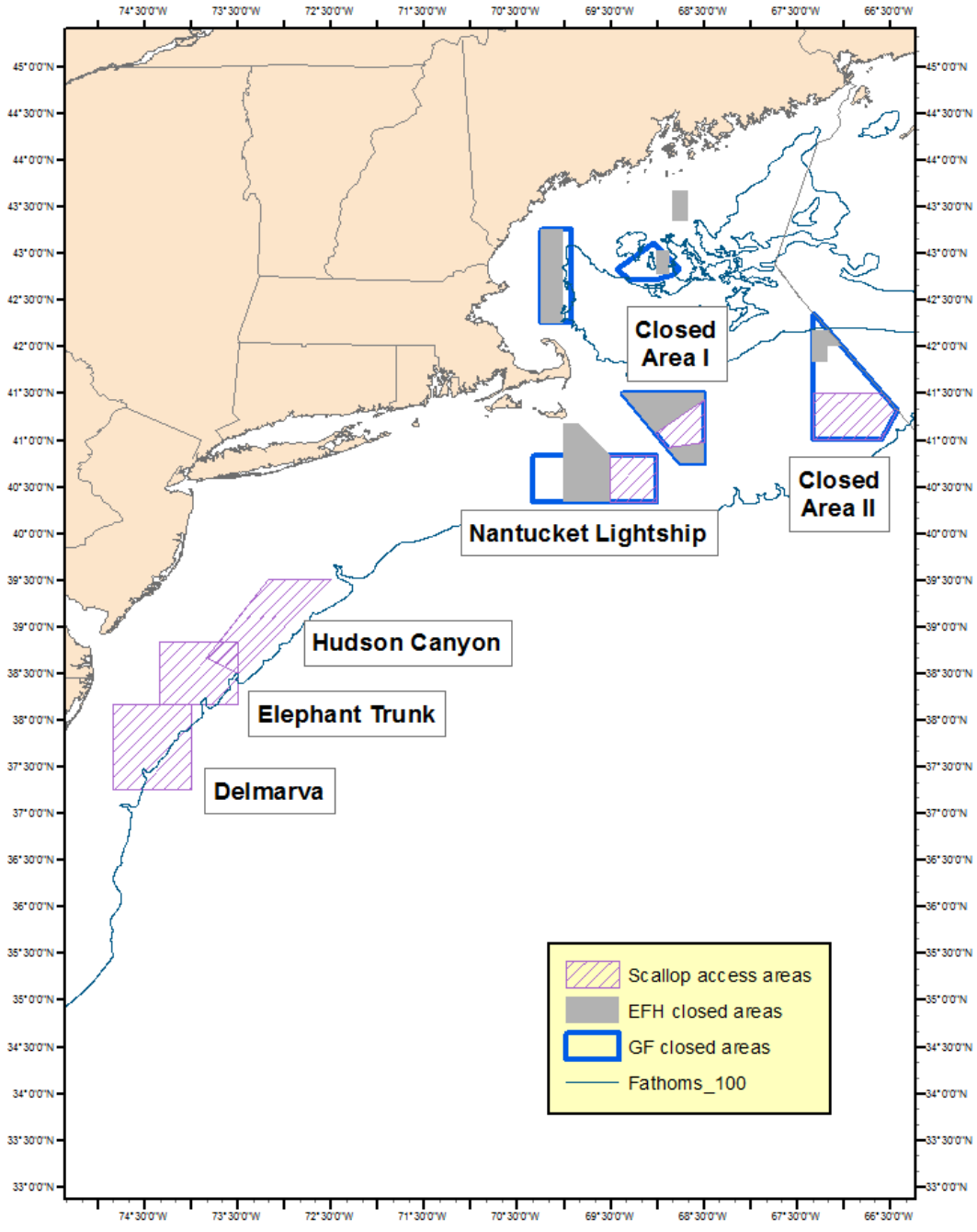
In 1999, Framework Adjustment 11 to the Scallop FMP allowed the first scallop fishing within portions of the Georges Bank groundfish closed areas since 1994 after resource surveys and experimental fishing activities had identified areas where scallop biomass was very high due to no fishing in the intervening years. This successful "experiment" with closing an area and reopening it for controlled scallop fishing further motivated the Council to shift overall scallop management to an area rotational system that would close areas and reopen them several years later to prevent overfishing and optimize yield.

In 2004, Amendment 10 to the Scallop FMP formally introduced rotational area management and changed the way that the FMP allocates fishing effort for limited access scallop vessels. Instead of allocating an annual pool of DAS for limited vessels to fish in any area, vessels had to use a portion of their total DAS allocation in the controlled access areas defined by the plan, or exchange them with another vessel to fish in a different controlled access area. The amendment also adopted several alternatives to minimize impacts on EFH, including designating EFH closed areas, which included portions of the groundfish mortality closed areas. See Section 1.3.2 below for a more detailed description of the rotational area management program implemented by Amendment 10.

As the scallop resource rebuilt under area rotation biomass increased inshore and fishing pressure increased by open access general category vessels starting in 2001. Landings went from an average of about 200,000 pounds from 1994-2000 to over one million pounds consistently from 2001-2003 and 3-7 million pounds each year from 2004-2006 (NEFMC, 2007). In June 2007 the Council approved Amendment 11 to the Scallop FMP and it was effective on June 1, 2008. The main objective of the action was to control capacity and mortality in the general category scallop fishery. Amendment 11 implemented a limited entry program for the general category fishery where each qualifying vessel received an individual allocation in pounds of scallop meat with a possession limit of 400 pounds. The fleet of qualifying vessels receives a total allocation of 5% of the total projected scallop catch each fishing year. This action also established separate limited entry programs for general category fishing in the Northern Gulf of Maine and an incidental catch permit category (up to 40 pounds of scallop meat per trip while fishing for other species).

More recently Amendment 15 to the Scallop FMP was implemented in 2011. This action brought the FMP in compliance with new requirements of the re-authorized MSA (namely ACLs and AMs) as well as a handful of other measures to improve the overall effectiveness of the FMP. A more detailed summary of the various annual catch limits and how fishery specifications are set in this fishery are described in Section 1.3.3.

Figure 2 – Past and present scallop management areas (purple hatched areas) with other reference areas



1.3.2 Summary of the scallop area rotation program

Rotational area management is the cornerstone of scallop fisheries management. There are four types of areas in this system: 1) "open areas" where scallop fishing can occur using DAS or IFQ; 2) areas completely closed to scallop fishing year-round to reduce impacts on EFH and/or groundfish mortality; 3) areas temporarily closed to scallop vessels to protect small scallops until a future date; and 4) areas open to very restricted levels of scallop fishing called "access areas". When scallop vessels are fishing in these areas they are limited in terms of total removal and sometimes season.

Amendment 10 introduced area rotation: areas that contain beds of small scallops are closed before the scallops experience fishing mortality, then the areas re-open when scallops are larger, producing more yield-per-recruit. The details of which areas should close, for how long and at what level they should be fished were described and analyzed in Amendment 10. Except for the access areas within the groundfish closed areas on Georges Bank, all other scallop rotational areas should have flexible boundaries. Amendment 10 included a detailed set of criteria or guidelines that would be applied for closing and re-opening areas. Framework adjustments would then be used to actually implement the closures and allocate access in re-opened areas.

The general management structure for area rotation management is described in **Table 3**. In theory, an area would close when the expected increase in exploitable biomass in the absence of fishing mortality exceeds 30% per year, and re-open to fishing when the annual increase in the absence of fishing mortality is less than 15% per year. Area rotation allows for differences in fishing mortality targets to catch scallops at higher than normal rates by using a time averaged fishing mortality so the average for an area since the beginning of the last closure is equal to the resource-wide fishing mortality target.

Figure 2 shows the boundaries of current and past scallop access areas (purple hatched areas) on Georges Bank and in the Mid-Atlantic. Areas that are closed to the scallop fishery are indicated as well: groundfish mortality closed areas (hollow) and EFH closed areas (hatched). For the most part some of these areas are closed to the fishery if small scallops are present, some areas are open as access areas with a controlled level of fishing, and some may be "open areas" that may be fished using DAS, not access area trips. Each year limited access vessels are allocated a set number of trips with possession limits to fish in specific access areas. And general category vessels are awarded a fleetwide maximum of trips that can be taken per area.

The NEFMC recently approved the EFH Omnibus Amendment, an action that considered modifications to the EFH and groundfish mortality closed areas in this region. Based on the outcome of that action the current boundaries of these closed areas may change. Therefore, future scallop access areas may also be different, and current restrictions to fish in EFH closed areas may be different as well. Since this action is primarily limited to FY2016, and those potential modifications, if approved, would not be implemented until mid-2016 under the best case scenario, Framework 27 is only considering specifications based on the current areas available to the scallop fishery. It is considered predecisional to consider fishery access in areas that are still closed.

Table 3- General management structure for area rotation management as implemented by Amendment 10

Area type	Criteria for rotation area management consideration	General management rules	Who may fish
Closed rotation	Rate of biomass growth exceeds 30% per year if closed.	No scallop fishing allowed Scallop limited access and general category vessels may transit closed rotation areas provided fishing gear is properly stowed. Scallop bycatch must be returned intact to the water in the general location of capture.	Any vessel may fish with gear other than a scallop dredge or scallop trawl Zero scallop possession limit
Re-opened controlled access	A previously closed rotation area where the rate of biomass growth is less than 15% per year if closure continues. Status expires when time averaged mortality increases to average the resource-wide target, i.e. as defined by the Council by setting the annual mortality targets for a re-opened area.	Fishing mortality target set by framework adjustment subject to guidelines determined by time averaging since the beginning of the most recent closure. Maximum number of limited access trips will be determined from permit activity, scallop possession limits, and TACs associated with the time-average annual fishing mortality target. Transfers of scallops at sea would be prohibited	Limited access vessels may fish for scallops only on authorized trips. Vessels with general category permits will be allowed to target scallops or retain scallop incidental catch, with a 400 pounds scallop possession limit in accordance with general category rules.
Open	Scallop resource does not meet criteria to be classified as a closed rotation or re-opened controlled access area	Limited access vessels may target scallops on an open area day-at-sea General category vessels may target sea scallops with dredges or trawls under existing rules. Transfers of scallops at sea would be prohibited	All vessels may fish for scallops and other species under applicable rules.

1.3.3 Summary of scallop fishery specifications and various annual catch limits

Amendment 15 established a method for accounting for all catch in the scallop fishery and included designations of Overfishing Limit (OFL), ABC, ACLs, and Annual Catch Targets (ACT) for the scallop fishery, as well as scallop catch for the Northern Gulf of Maine (NGOM), incidental, and state waters catch components of the scallop fishery. The scallop fishery assessment will determine the exploitable biomass, including an assessment of discard and incidental mortality (mortality of scallops resulting from interaction, but not capture, in the scallop fishery).

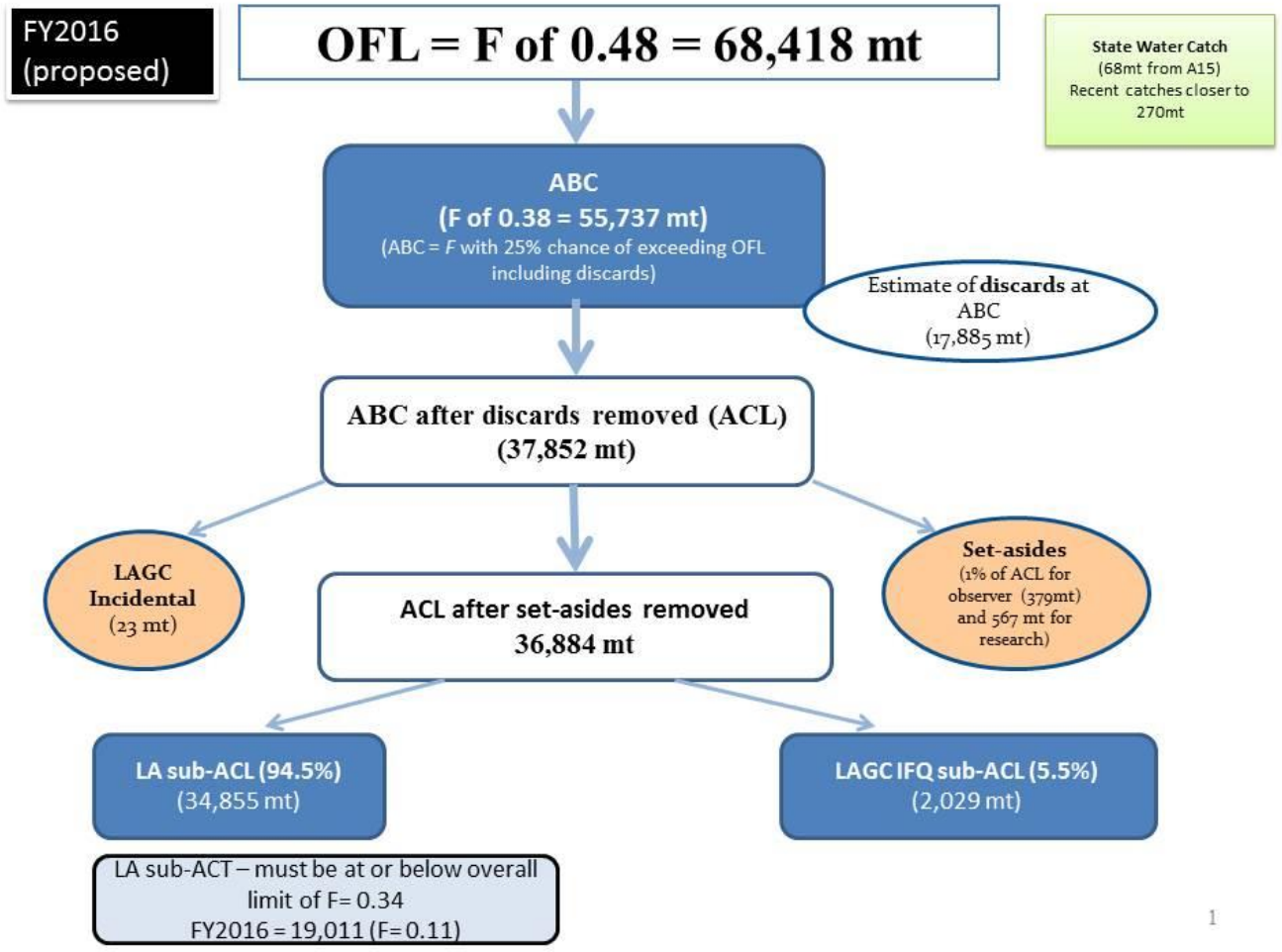
Based on the assessment, OFL is specified as the level of landings, and associated F that, above which, overfishing is occurring. OFL will account for landings of scallops in state waters by vessels without Federal scallop permits. The previous assessment of the scallop fishery (SAW 50, 2010) determined that the F associated with the OFL is 0.38. The updated assessment, SARC59, approved a higher OFL equivalent to 0.48. To account for scientific uncertainty, ABC is set at a level with an associated F that has a 25-percent probability of exceeding F associated with OFL (i.e., a 75-percent probability of being below the F associated with OFL).

In the Scallop FMP ACL is equal to ABC. SAW 50 determined that the F associated with the ABC/ACL is 0.32. The updated assessment, SARC 59, approved a higher OFL; therefore, the F associated with ABC/ACL is higher as well, F = 0.38. Set-asides for observer and RSA are removed from the ABC (1 percent of the ABC/ACL and 1.25 M lb. (567 mt) respectively). After those set-asides are removed, the remaining available catch is divided between the LA and LAGC fisheries into two sub-ACLs; 94.5% for the LA fishery sub-ACL, and 5.5% for the LAGC fishery sub-ACL. **Figure 3** summarizes how the various ACL terms are related in the Scallop FMP.

To account for management uncertainty, Amendment 15 established ACTs for each fleet. For the LA fleet, the ACT will have an associated F that has a 25-percent chance of exceeding ABC. The major sources of management uncertainty in the LA fishery are carryover provisions including the 10 DAS carryover provision, and the ability to fish unused access area allocation within the first 60 days of the following fishing year. The F associated with this ACT for the LA fishery is currently estimated to be 0.28. The fishery specifications allocated to the fishery may be set at an F rate lower than this level based on available resource, but fishery specifications may not exceed this level. For example, in FY2014 several specification alternatives were considered that had various estimated of overall F ranging from 0.10 to 0.21. Again, because the updated assessment, SARC59 approved a higher OFL, the F associated with ACT is higher as well. The new ACT is based on applying an overall fishing mortality of 0.34. For the LAGC fleet, the ACT will be set equal to the LAGC fleet's sub-ACL, since that fishery is quota managed and is presumed to have less management uncertainty.

Finally, catch from the NGOM is established at the ABC/ACL level, but is not subtracted from ABC/ACL. Since the NGOM portion of the scallop fishery is not part of the scallop assessment, the catch will be added and specified as a separate Total Allowable Catch (TAC), in addition to ABC/ACL.

Figure 3 – Example of how catch limits are set in the Scallop FMP using FY2016 as proposed in this action



1.4 DEFAULT MEASURES FOR FY2016 APPROVED IN PREVIOUS SCALLOP ACTION (FRAMEWORK 26)

The Council routinely sets default measures for the fishing year following the intended length of an action in the event that subsequent actions are not in place at the start of the following fishing year. For example, the scallop fishing year starts on March 1, but complete management measures are not usually in place until May. This lag is primarily due to the fact that scallop specifications are set using the most up to date survey data collected the summer before the start of the fishing year. The results are typically available in August, a new ABC is reviewed by the SSC in September, and the PDT develops and analyzes specification alternatives in early fall before final Council action at the November meeting. Staff generally completes the submission package by the end of the year and the action is reviewed and implemented by NMFS typically in May.

In the past, measures have been in place on March 1 that are inferior to measures proposed for implementation in a subsequent action using more updated information. For example, ultimate catch levels may be higher or lower depending on updated survey results, some areas with access area trips assigned may not be able to support that level of effort, or small scallops may show up in a new survey suggesting the area should be closed to protect new recruitment. In some years in order to minimize the potentially negative impacts of having measures in place on March 1 that ultimately need to be changed, the Council has only allocated DAS to the limited access fishery; no access area trips were assigned to limited access vessels or general category vessels.

The Council has the authority to set more measures as default, but for the most part has mostly only allocated DAS. However, in FW26 the Council decided to also allocate one access area trip in the Mid-Atlantic access area effective on April 1. It was relatively certain that some level of access would be available in the MA AA in 2016 when measures were developed in 2014; therefore, a limited level of access was included in default measures. April 1 was stipulated to give scallops one additional month of growth potential before the new allocations. In addition, vessels would be able to fish FY 2015 compensation trips in the access areas that were open in FY 2015 for the first 60 days of FY2016 (i.e., March 1 through April 29, 2015). This carryover provision has been in place for many years. Under FY2016 default measures the Council also stipulated that 2016 RSA compensation fishing would not be allowed in access areas, until a new framework action allowed it (potentially FW27, this action). The crew limits in place for both open and access areas (one additional crew member compared to open areas) would remain in place under default measures.

The default measures for 2016 also included the required ABC and ACL values, but they will likely be replaced by this action. The table below summarizes the default values that will be effective on March 1, 2016 until FW27 is implemented to replace them. Vessels with a LAGC IFQ permit will receive an allocation based on the contribution factor assuming the total LAGC IFQ is 3.7 million pounds. Their allocations for FY2016 may ultimately change based on the final sub-ACL approved in FW27. LAGC IFQ vessels are responsible to payback any overage the following year if the ultimate IFQ for FY2016 is lower than the allocation under the default sub-ACL.

If FW27 is not adopted these default allocations would remain in place for all of FY2016 and beyond until replaced by a subsequent action.

Table 4 - ACL related values and allocations for 2016 (default measures approved in FW26)

	2016 (default)	
	MT	lbs.
OFL	45,456	100,213,343
ABC/ACL (discards removed)	31,807	70,122,444
incidental	23	50,045
RSA	567	1,250,021
OBS	318	701,224
ACL for fishery	30,899	68,121,153
LA ACL	29,200	64,374,490
LAGC ACL	1,699	3,746,663
LAGC IFQ	1,545	3,406,058
LA with LAGC IFQ	154	340,606

** 2016 measures are default and expected to be adjusted based on FW27*

Table 5 – Summary of FY2016 default allocations for LA vessels (approved in FW26)

	LA FT	LA PT	LA Occasional
2015	26	10.4	2

** Default DAS is 75% of the total DAS projected for FY2016 (34DAS)*

2.0 MANAGEMENT ALTERNATIVES UNDER CONSIDERATION

2.1 OVERFISHING LIMIT AND ANNUAL BIOLOGICAL CATCH

The MSA was reauthorized in 2007. Section 104(a) (10) of the Act established new requirements to end and prevent overfishing, including annual catch limits (ACLs) and accountability measures (AMs). Section 303(a)(15) was added to the MSA to read as follows: ‘‘establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.’’ The Council adopted Scallop Amendment 15 to comply with these new ACL requirements, and that action was implemented in 2011.

Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. The determination of ABC will consider scientific uncertainty and the Council may not exceed the fishing level recommendations of its Science and Statistical Committee (SSC) in setting ACLs (Section 302(h)(6)). The MSA enhanced the role of the SSCs, mandating that they shall provide ongoing scientific advice for fishery management decisions, including recommendations for

acceptable biological catch (MSA 302(g(1)(B)). This requirement for an SSC recommendation for ABC was effective in January 2007.

2.1.1 Alternative 1 - No Action for OFL and ABC

Under "No Action", the overall OFL and ABC would be equivalent to default 2016 values adopted in Framework 26 (**Table 6**) that were calculated for FY2015 and FY2016 based on survey and fishery data through 2014. These would remain in place until a subsequent action replaced them. These values were selected based on the same control rules: 1) OFL is equivalent to the catch associated with an overall fishing mortality rate equivalent to Fmsy; and 2) ABC is set at the fishing mortality rate with a 25% chance of exceeding OFL where risk is evaluated in terms of the probability of overfishing compared to the fraction loss to yield. These values include estimated discard mortality. Therefore, when the fishery specifications are set based on these limits, the estimate of discard mortality is removed first and allocations are based on the remaining ABC available (**Table 6**, column to the far right).

Table 6 – Summary of OFL and ABC FY2016 (default) values approved by the SSC in Framework 26 (in metric tons)

	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards removed)
2016 (default)	45,456	37,903	6,096	31,807

Once OFL and ABC are established, associated ACLs for the fishery can be defined. The table below summarizes the various ACL allocations for the fishery under 2016 default measures in Framework 26 (Table 7).

Table 7 – Summary of ACL related values for the scallop fishery based on default FY2016 values in Framework 26

	2016 (default)	
	MT	lbs.
OFL	45,456	100,213,343
ABC/ACL (discards removed)	31,807	70,122,444
incidental	23	50,045
RSA	567	1,250,021
OBS	318	701,224
ACL for fishery	30,899	68,121,153
LA ACL	29,200	64,374,490
LAGC ACL	1,699	3,746,663
LAGC IFQ	1,545	3,406,058
LA with LAGC IFQ	154	340,606

2.1.2 Alternative 2 - Updated OFL and ABC for FY2016 and FY2017 (default) - (preferred alternative)

The SSC recommendation is to update OFL and ABC based on updated fishery and survey data through 2015. The PDT presented updated values and recommended that same OFL and ABC values be used for both 2016 and 2017, despite increased projections for FY2107 (**Table 8**). While biomass is expected to increase dramatically in 2017, the PDT expressed concern that the model may be seriously underestimating natural mortality of juvenile scallops in high density areas.

In summary, while biomass is expected to increase dramatically in 2017 the PDT is concerned that the model may be seriously underestimating natural mortality of juvenile scallops in high density areas. See Section 5.1.2.1.9 for more information. If higher than normal natural mortality occurs, these estimates will be overestimated, especially for 2017. The model currently assumes constant natural mortality (0.16 on GB and 0.2 in the Mid-Atlantic on all sizes except the plus group). However, the PDT believes that natural mortality of juveniles is higher in areas of high density.

There are practical management risks with setting the 2017 default values high and potentially needing to later correct them. The IFQ allocations for the LAGC fishery and observer set-aside program are based on the ABC/ACL value and those go into effect at the start of the fishing year. Therefore, it is more risk averse to keep those allocations at 2016 levels until more updated estimates are completed in 2016 for FY2017 OFL and ABC estimates.

There are practical management risks with setting the 2017 default values high and potentially needing to later correct them. The IFQ allocations for the LAGC fishery and observer set-aside program are based on the ABC/ACL value and those go into effect at the start of the fishing year. Finally, Framework 27 is a one year action and the OFL and ABC estimates will be reviewed again next year.

Table 8 – Summary of proposed OFL and ABC FY2016 and FY2017 (default) values approved by the SSC for Framework 27 (in metric tons)

	OFL (including discards at OFL)	ABC (including discards)	Discards (at ABC)	ABC available to fishery (after discards removed)
2016	68,418	55,737	17,885	37,852
2017 (default)	68,418	55,737	17,885	37,852

Note: 2017 default projections were replaced with 2016 estimates

Once OFL and ABC are established, associated ACLs for the fishery can be defined. The table below summarizes the various ACL allocations for the fishery based on decisions made in Amendment 15 when ACLs were implemented (Table 9).

Table 9 – Summary of ACL related values for the scallop fishery based on updated OFL and ABC values (*note they are the same for 2016 and 2017*)

	2016		2017 (default)	
	MT	lbs.	MT	lbs.
OFL	68,418	150,835,870	68,418	150,835,870
ABC/ACL (discards removed)	37,852	83,449,375	37,852	83,449,375
incidental	23	50,000	23	50,000
RSA	567	1,250,000	567	1,250,000
OBS	379	835,552	379	835,552
ACL for fishery	36,884	81,315,314	36,884	81,315,314
LA ACL	34,855	76,842,134	34,855	76,842,134
LAGC ACL	2,029	4,473,180	2,029	4,473,180
LAGC IFQ	1,845	4,067,529	1,845	4,067,529
LA with LAGC IFQ	184	405,650	184	405,650
LA ACT	*Varies based on specification alternative selected*			

2.2 FISHERY SPECIFICATIONS

Specifications for the limited access fishery include DAS and access area trips as limited by the ACT for the limited access fishery and what areas are open to the fishery.

Specifications for the LAGC fishery include an overall IFQ allocation for vessels with LAGC IFQ permits, a hard TAC for vessels with a LAGC NGOM permit, and a target TAC for vessels with a LAGC incidental catch permit (40 pound permit). A summary table with the full range of specification alternatives is included in Note: *This figure updated with corrected boundaries for the NL north area using original coordinates provided in Table 12 of Decision Draft.*

Table 13.

2.2.1 Overall Fishery Allocations

2.2.1.1 Alternative 1 - No Action (Default measures from Framework 26)

Under No Action, the sub-ACL for the LA fishery would be 29,200 mt (64,374,490 lb.). The specifications would include default measures approved in Framework 26 for FY2016 which are 75% of the projected DAS for that year. For full-time vessels that is equivalent to 26 DAS (75% of 34 DAS) and 10.4 DAS for part-time vessels. LA vessels would have some access in the MA access area, the equivalent of one 17,000 pound trip for FT vessels. However, the area would not open for new 2016 allocations until April 1, 2016. These measures would remain in place until replaced by another action.

Under FY2016 default measures the LAGC IFQ allocation is 1,699 mt for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit. This allocation is equivalent to 5.5% of the ACL projected for FY2016 from FW26. LAGC IFQ vessels would also have access in the MA AA on April 1, 2016 under default measures, equal to 361,445 pounds or 602 trips (6.5% of the projected TAC for MA AA in 2016 under FW26).

On March 1, 2016 LAGC vessels will be allocated an individual quota based on default measures that will likely be different than the allocation LAGC IFQ vessels will ultimately be allocated under FW27. Similar to recent years, LAGC vessels will need to be aware that final allocations for FY2016 are likely to be different than allocations received on March 1, 2016 before FW27 is implemented.

No action for the NGOM hard TAC is 70,000 pounds and the target TAC for vessels with a LAGC Incidental permit is 50,000 pounds.

2.2.1.2 Alternative 2 – Basic Run (Specifications based on basic run using fishing mortality target principles in the FMP with no modifications to scallop access area boundaries)

This is the basic alternative the PDT generally begins with when identifying possible specification alternatives. The overall intent of this alternative is to set target catches using the three principles developed as part of the "hybrid" overfishing definition approved in Amendment

15, and not include additional closures or modifications to boundaries of the overall area rotation program. The three main principles that are generally used in this FMP to set target catches for the fishery are:

1) fishing mortality in open areas cannot exceed Fmsy;
2) a spatially averaged fishing mortality target is limited to the landings associated with the annual catch target (ACT) for the fishery overall from all areas combined (open and closed areas); and
3) fishing mortality targets for access areas are based on a time-averaged principle, higher F in some years followed by closures or limited fishing levels in other years.

The maximum that the annual catch target can be set at is the catch associated with applying a fishing mortality rate of 0.34 overall, 0.04 below ABC/ACL, currently estimated at 0.38, to account for management uncertainty. But in reality some areas are closed and not available to the scallop fishery. Therefore, in practice, the projected catch associated with ACT cannot exceed 0.34 overall, but target catches are actually driven by the three overall principles developed as part of the "hybrid" overfishing definition approved in Amendment 15 (F in open areas cannot exceed Fmsy; F in access areas set annually at a level that results in F no higher than Fmsy when averaged over time; and the combined target F in open, access, and closed areas cannot exceed F associated with ACT, currently 0.34). In a given year, one of these three principles will be the constraining element that dictates what the ultimate target F is for a particular alternative, in many cases below ACT (0.34). For example, for FY2016 under this alternative, the constraining factor for setting projected catches is the open area max of 0.48. The overall estimate of F combined from all areas open and closed under this alternative is 0.11.

The specific allocations associated with this specification alternative are:

- Total FY2016 projected catch for this alternative is 48.5 million pounds (from all sources of catch and areas)
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- 36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels. All DAS allocations will be adjusted to allow for flexibility provided under FW26 for vessels to declare out of the fishery at Cape May and steam off the clock. The DAS reduction is 0.14 for FT LA vessels and 0.06 for PT LA vessels.
- Access areas open to the fishery under this alternative are: the Mid-Atlantic Access Areas and Closed Area 2. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.

2.2.1.3 Alternative 3 – Basic run for specifications and additional closure south of CA2 to further protect small scallops

The overall intent of this alternative is to reduce discard and incidental mortality on small scallops observed in this area. A large year class of scallops was observed in this area in 2014

and 2015. These scallops will be susceptible to impacts from fishing gear in 2016; therefore, closing the area is expected to maximize yield per recruit for scallops in this area if access is delayed. If this alternative is selected vessels would have access into the current access area within CA2, but the current open area south of the access area would be closed to all fishing (Figure 4). The model the PDT uses to estimate DAS projects that a total of about 5% of total DAS effort will be used in that area in 2016. Therefore, when that area is closed DAS allocations are reduced by that amount, which comes out to about 1.84 DAS per FT vessel, and total projected landings also decline by about 1.5 million pounds.

The specific allocations associated with this specification alternative are:

- Total FY2016 projected catch for this alternative is 46.9 million pounds (from all sources of catch and areas)
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- 34.69 DAS for LA FT vessel, 13.88 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels. All DAS allocations will be adjusted to allow for flexibility provided under FW26 for vessels to declare out of the fishery at Cape May and steam off the clock. The DAS reduction is 0.14 for FT LA vessels and 0.06 for PT LA vessels. Therefore, the final allocations would be 34.55 for LA FT vessels and 13.82 for LA PT vessels.
- Access areas open to the fishery under this alternative are: the Mid-Atlantic Access Areas and Closed Area 2. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- A new area would close south of CA2 (Figure 4)

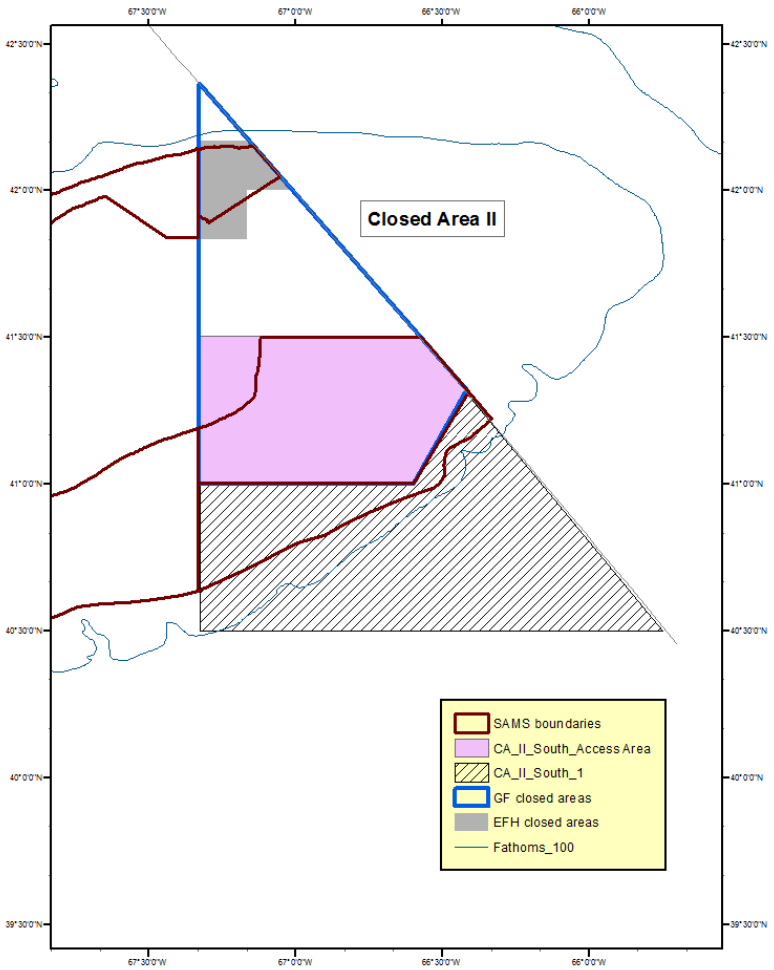
The size of this extension area is 3,178 square nautical miles, larger than the status quo scallop access area within CA2 (1,025 square nautical miles). The boundaries are in Table 10.

Vessels are currently prohibited from transiting through the scallop access area within Closed Area II, primarily because it is far offshore and abuts the US-Canada maritime border. Therefore, the need to transit through the area to get to port from primary scallop fishing grounds is minimal. When the Enforcement Committee reviewed this alternative in a previous action, FW26, a consensus statement was drafted related to transit rule recommendations, "allowing transiting through a closed area is difficult to enforce." Therefore, it was clarified that if this area is closed, the current prohibition for transiting should apply in the expanded area as well since it is a relatively low transit area and is not located between active fishing grounds and fishing ports.

Table 10 – Boundaries of Closed Area II scallop access area extension (Figure 4)

	Latitude	Longitude
Point 1	40 30’ N	67 20’ W
Point 2	41 00’ N	67 20’ W
Point 3	41 00’ N	66 35.8’ W
Point 4	41 18.6’ N	Intersection of 41 18.6’ N and the US-Canada Maritime Boundary, approximately 66 24.8’ N
Point 5	40 30’ N	Intersection of 40 30’ N and the US-Canada Maritime Boundary, approx. 66 34.73’W
Point 1	40 30’ N	67 20” W

Figure 4 – Alternative 3 – potential closure of open area below Closed Area II access area (hatched area). The existing CA2 access area would be open to the fishery in 2016



2.2.1.3.1 Alternative 3a – Basic run with CA2 south extension and no access in CA2 (*preferred alternative*)

This alternative was added for consideration at the final Council meeting based on a Scallop Committee motion from their November 19, 2015 meeting. It is the same as Alternative 3, except LA vessels would not be allocated trips in CA2south. Instead, those trips would be shifted to MAAA. The result is that each LA FT vessel would be allocated 51,000 pounds in MAAA; no LA vessels would have allocations in CA2. The total projected catch in CA2 was about 1,000 mt or 2.2 million pounds. If this alternative is selected the access from CA2 south would be available in MAAA instead. The status of the access areas under the preferred alternative are described in **Figure 1**; MAAA open with the inshore portion of ETA closed, CA1 and CA2 access areas closed, and NL-north open to LAGC vessels only (See Section 2.2.3.2 for details of that measure).

2.2.1.4 Alternative 4 – Basic run for specifications and expanded closure of ETA closed to further protect small scallops

In Framework 26 an inshore portion of ETA was closed. This alternative considers extending the spatial coverage of that closure to the south and east to better protect small scallops. The overall intent of this alternative is to extend the closure to better cover the highest concentrations of small scallops that were again observed in 2015. Waters west of ETA closed were open to the scallop fishery in 2015, and for the most part the inshore areas closest to ETA closed were fished most heavily (Figure 48 - Figure 50).

The 2015 surveys show that the highest concentrations of large scallops are in deeper waters, west of the proposed extension in this alternative (**Figure 46** and **Figure 47**). When the AP first reviewed this idea they recommended leaving a corridor in deeper waters so vessels could fish from one access area to the next and not have to steam around a closure.

The specific allocations associated with this specification alternative are:

- Total FY2016 projected catch for this alternative is 48.5 million pounds (from all sources of catch and areas)
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- 36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels. All DAS allocations will be adjusted to allow for flexibility provided under FW26 for vessels to declare out of the fishery at Cape May and steam off the clock. The DAS reduction is 0.14 for FT LA vessels and 0.06 for PT LA vessels.
- Access areas open to the fishery under this alternative are: the Mid-Atlantic Access Areas and Closed Area 2. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- The ETA closed area would expand (Figure 5)

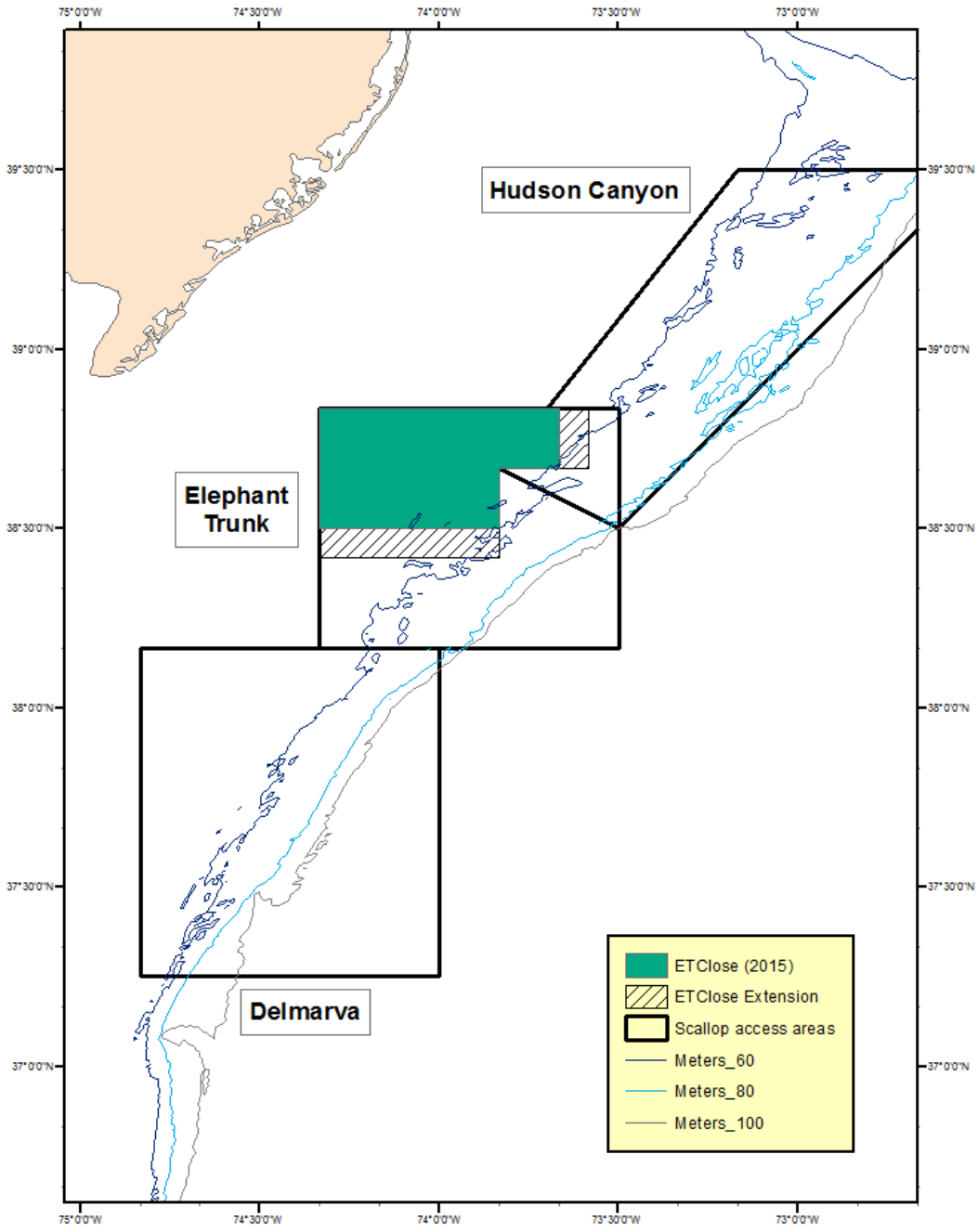
The size of this extension area only is 538 square kilometers. The original ETA closed area from FW26 is 1,878 square kilometers and the extension plus the original area is 2,416 square kilometers. For reference, the entire ETA access area (open and closed) is 5,376 square kilometers, so the original closure is about 35% of ETA, and the proposed closure in this alternative is about 45% of the total ETA access area. The boundaries are in Table 11 and shown with both juvenile and exploitable biomass in Figure 5.

If adopted, vessels would be prohibited from transiting through this area. When ETA closed was adopted in FY2015, transiting was prohibited as well and the same rationale still applies. While a bit larger than the area closed in FY2015, the proposed subarea is still relatively small and the incentive to fish in the area is high since abundance is high and the area is closer to shore and between primary fishing grounds and fishing ports. During development of FW26 the Enforcement Committee developed a consensus statement related to this provision, "allowing transiting through a closed area is difficult to enforce."

Table 11 – Boundaries of proposed ETA Closed extension (Figure 5)

	Latitude	**Longitude**
Point 1	38°50' N.	74°20' W.
Point 2	38°50' N.	73°35' W.
Point 3	38°40' N.	73°35' W.
Point 4	38°40' N.	73°50' W.
Point 5	38°25' N.	73°50' W.
Point 6	38°25' N.	74°20' W.
Point 1	38°50' N.	74°20' W.

Figure 5 – Alternative 4 – potential extension of ETA closed (hatched area)



2.2.1.5 Alternative 5 – Basic run for specifications and include limited allocation of effort in northern part of Nantucket Lightship Access Area

The PDT did not originally recommend access in NL for 2016 due to the very high abundance of small scallops and relatively low abundance of exploitable scallops. The AP and Committee requested that an alternative be added to consider a limited level of effort in the northern part of the area only. The overall intent of this alternative is to spread access area effort into more areas and provide another near shore access area, particularly for smaller vessels that are not expected to fish in CA2. While the level of removal may not be very high from NL (estimated to be less than 1 million pounds), this alternative considers a limited amount of effort to a portion of the NL access area expected to have lower densities of small scallops. The highest densities are in the southern part of the current access area and to the west in the EFH closed area.

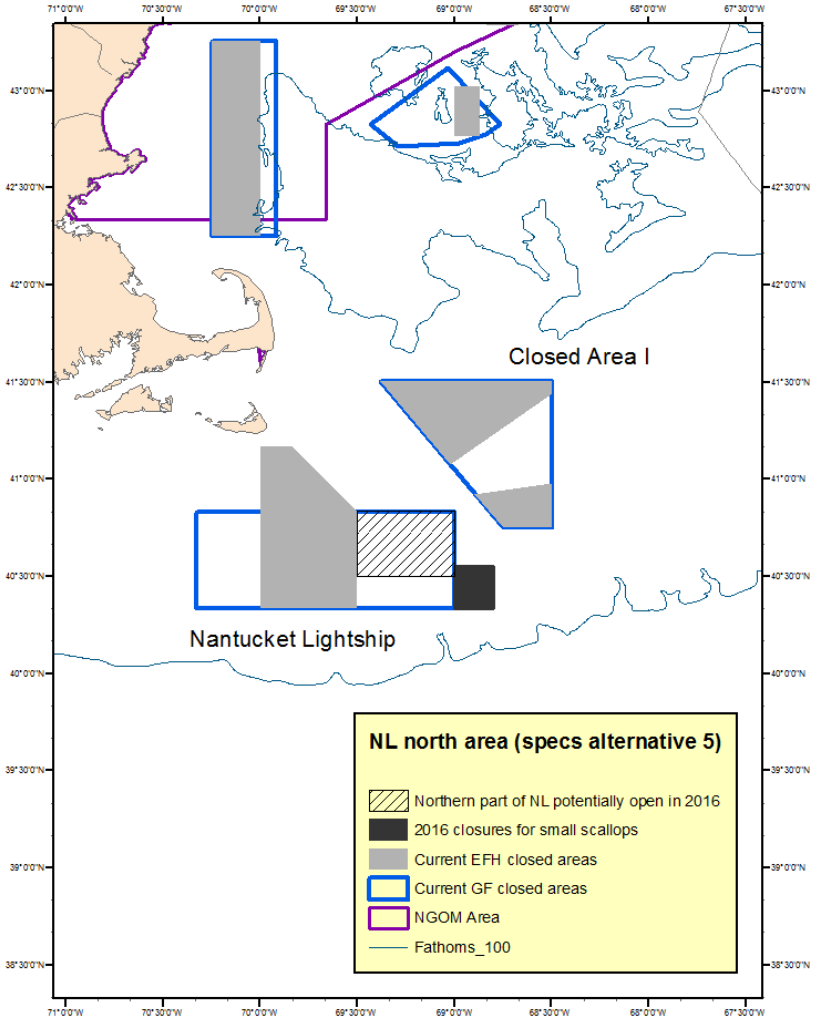
The specific allocations associated with this specification alternative are:

- Total FY2016 projected catch for this alternative is 48.5 million pounds (from all sources of catch and areas)
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- 36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels. All DAS allocations will be adjusted to allow for flexibility provided under FW26 for vessels to declare out of the fishery at Cape May and steam off the clock. The DAS reduction is 0.14 for FT LA vessels and 0.06 for PT LA vessels.
- Access areas open to the fishery under this alternative are: the Mid-Atlantic Access Areas, Closed Area 2, **and the northern part of NL**. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- The portion of NL that would be open is shown in (Figure 6)

Table 12 – Boundaries of proposed access area within NL (Figure 6)

	Latitude	Longitude
Point 1	40°50’ N.	69°00’ W.
Point 2	40°30’ N.	69°00’ W.
Point 3	40°30’ N.	69°30’ W.
Point 4	40°50’ N.	69°30’ W.
Point 1	40°50’ N.	69°00’ W.

Figure 6 – Alternative 5 – controlled access would be granted in hatched portion of NL (NL-Acc-N)



Note: This figure updated with corrected boundaries for the NL north area using original coordinates provided in Table 12 of Decision Draft.

Table 13 – Summary of specification alternatives in Framework 27 *(preferred alternative is 3a)*

	Alt 1	Alt 2	Alt 3	*Alt 3a*	Alt 4	Alt 5
Description of Alternative	**No Action**	**Basic run**	**Basic Run + CA2S ext closure**	***Pref Alt* Basic Run + CA2S ext closure and no access in CA2**	**Basic Run + expansion of ETA closed**	**Basic run + Access in NL-N**
Total catch (2016)	30.6 mil	48.5 mil	46.9 mil	46.9 mil	48.5 mil	48.5 mil
FT LA DAS*	26 DAS	36.53 DAS	34.69 DAS	34.69 DAS	36.53 DAS	36.53 DAS
PT LA DAS*	10.4 DAS	14.61 DAS	13.88 DAS	13.88 DAS	14.61 DAS	14.61 DAS
Total AA (mil lbs. and mt)	5.5 2,500	16.6 7,550	16.6 7,550	16.6 7,550	16.6 7,550	16.6 7,550
FT AA Allocation (poss limit)	17,000 17,000	51,000 17,000	51,000 17,000	51,000 17,000	51,000 17,000	51,000 17,000
# of PT AA trips (poss limit)	10,200 10,200	20,400 10,200	20,400 10,200	20,400 10,200	20,400 10,200	20,400 10,200
MAAA	open	open	open	open	open	open
CA2	closed	open	open	closed	open	open
NL	closed	closed	closed	closed**	closed	open
CA1	closed	closed	closed	closed	closed	closed
Gen Cat	3.75 mil 1699 mt	4.47 mil 2029 mt	4.47 mil 2029 mt	4.47 mil 2029 mt	4.47 mil 2029 mt	4.47 mil 2029 mt

**Note that DAS have not been reduced yet to account for implementation of a measure that allows vessels to declare out of the fishery south of Cape May, NJ. This measure was adopted in Framework 26 and a DAS adjustment will be applied until reviewed in several years. Until changed annual DAS will be reduced by 0.14 for LA FT vessels and 0.06 for LA PT vessels.*
*** Under the preferred alternative, NL will be closed to LA vessels (Section 2.2.1.3.1) and research set-aside compensation fishing (Alternative 2.2.4.3). The northern portion of NL will however be open to some fishing by LAGC vessels, about 300,000 pounds (Alternative 2.2.3.2.3).*

2.2.1.6 Default measures for 2017 (preferred alternative)

The PDT recommends that default measures for the limited access fishery only include DAS, set at 75% of the projected DAS for 2017. For example, for the preferred alternative, Alternative 3a, the total projected landings for FY2017 is 81.5 million pounds and 45 DAS for full-time vessels. If that is reduced by 75% the DAS allocation would be 33.75 DAS. This level is very similar to proposed DAS levels under consideration in this action for FY2016. The Scallop Committee clarified that default measures should also include a reduced level of access in MAAA. Therefore, the default measures for LA vessels will be 75% of projected DAS and the equivalent of one MAAA trip, or 17,000 pounds for FT vessels and 10,200 for LA PT vessels. LA vessels would not be allowed to fish default allocations in MAAA until April 1, 2017.

The PDT recommends that the default measures for LAGC IFQ vessels be equivalent to 2016 levels (2,029 or 4.47 million pounds). In the past the default measures for LAGC IFQ vessels has been equal to the projected catch level, and not a rollover of current levels, as proposed here. But due to the uncertainties described, the PDT believes the estimates for 2017 are optimistic and may decline after updated information is added. Since the LAGC IFQ allocation is derived from the overall ABC, which is from scallops in all areas (open and closed) and all sizes, the impacts of these optimistic projections are exacerbated. Rather than reduce allocations several weeks later, the PDT recommends that 2016 allocations rollover until a subsequent action replaces them. The Scallop Committee clarified that default measures should also include a reduced level of access in MAAA for general category vessels as well. Therefore, the default measures for LAGC vessels will include a fleetwide maximum of 851 trips from MAAA, one third of the total access area allocation from 2016. The default access area trips for LAGC vessels in MAAA would not open to the fishery until April 1, 2017.

2.2.2 Allocation method for FT LA access area allocations

When there is not sufficient TAC in an area to provide a trip to each LA vessel, a lottery system is used to allocate trips from different areas. In 2016 the projected specifications include 51,000 pounds of access area catch per LA FT vessel, with a 17,000 pound possession limit that equates to three trips. Based on the projected TACs per access area there is sufficient projected landings for each vessel to receive the equivalent of two trips from the MAAA, but the third trip would need to be split between multiple areas for some of the specification alternatives. Two options were developed below based on whether access is granted into NL-N (Lottery Option 2) or not (Lottery Option 1). There are 313 LA FT vessels, therefore the lottery is only for 313 trips, or 17,000 pounds per vessel since each LA FT vessel would also receive 34,000 pounds from MAAA. If all LA trips are allocated to MAAA (Alternative 3a, the preferred alternative), then no lottery would be needed; all LA vessels would have equal access to the same area (Alternative 2.2.2.1 No Action).

To date, the lottery system has only been used for FT vessels, and part-time vessels have been given the flexibility to fish their allocation from any area open to the fishery that year. The PDT discussed that for the alternative that includes access in NL it may be important to consider a lottery allocation for that permit category as well to reduce mortality in that area. There are 34 LA PT vessels, and their allocation is equivalent to 40% of a FT permit. Therefore, their access

for 2016 is 20,400 pounds (40% of 51,000 pounds). With a possession limit of 10,200 pounds that is equivalent to two trips per part time vessel. Since the preferred alternative only includes access in one area for LA vessels, it was not necessary to include specific alternatives for a lottery system for PT vessels in this action.

2.2.2.1 No Action – No Lottery – equal access per vessel (preferred alternative)

Under this alternative there would not be a lottery. Each LA vessel in each permit category (FT, PT, Occasional), would receive the same level of access. For example, under the preferred alternative (Alternative 3a) each FT LA vessel would receive 51,000 pounds in the MAAA. No lottery would be necessary because each vessel is allocated the same amount per area. The preferred alternative only includes one access area for LA vessels; therefore no lottery is necessary.

2.2.2.2 Lottery Option 1 – Lottery allocation for specification alternatives with MA and CA2 access only

The equivalent of one FT LA trip (17,000 pounds) would be allocated by lottery based on the table below (Table 14). Specifically, the equivalent of a third trip for each full-time LA vessel would be allocated by lottery. Under this option, when NL is closed, 183 of the 313 FT LA vessels would receive the equivalent of a third trip from MAAA, and 130 FT LA vessels would receive an allocation of one trip from CA2. A lottery would not be done for PT LA vessels.

The projected catches per area have been reduced for convenience and to acknowledge some level of mortality from other sources (LA PT and LAGC IFQ fishing in access areas). This action is considering a range of alternatives for the level of access for LAGC IFQ vessels overall and per area (Section 2.2.3). Therefore, the ultimate allocations per area may be different. To reduce confusion, the LA allocations per area will not change based on the decision made for LAGC access. Specifically, the allocation of 51,000 pounds per FT LA vessels will remain the same whether or not the LAGC IFQ fishery is allocated 414.5 mt (about 900,000 pounds) from access areas under the lowest allocation alternative (Alternative 2.2.3.1.1), or 694.7 mt (1.5 million pounds) under the highest (Alternative 2.2.3.1.2). Therefore, it should be recognized that realized mortalities per area may be different than projections since the level of access per area may vary based on the final decisions.

Table 14 – Lottery Option 1 allocations for LA FT vessels (if NL remains closed)

2016	Projected Landings (mt)	Total # of Possible Trips	Trips available for lottery	Lottery*
MAAA	6500	843	217	183
CA2	1000	130	130	130
Total	7500	973	347	313

2.2.2.3 Lottery Option 2 – Lottery allocation for specification alternatives with NL access included

The equivalent of one FT LA trip (17,000 pounds) would be allocated by lottery based on the table below (**Table 15**). Specifically, the equivalent of a third trip for each full-time LA vessel would be allocated by lottery. Under this option, when NL is open, 157 of the 313 FT LA vessels would receive the equivalent of a third trip from MAAA, 104 FT LA vessels would receive an allocation of one trip from CA2, and 52 FT LA vessels would receive an allocation for a third trip from NL-north. A lottery would not be done for PT LA vessels.

Table 15 – Lottery Option 2 allocations for LA FT vessels (if NL opens)

2016	Projected Landings (mt)	Total # of Possible Trips	Trips available for lottery	Lottery*
MAAA	6100	791	165	157
CA2	1000	130	130	104
NLS	400	52	52	52
Total	7500	973	347	313

2.2.3 Allocation of LAGC IFQ trips in access areas

The LAGC IFQ fishery is allocated a fleetwide total number of access area trips. Individual vessels are not required to take trips in specific areas like access area trips allocated to the limited access fishery. Instead, a maximum number of trips are identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. The level of allocation can vary and is specified in each framework action. This action is considering several allocation options, as well as several area options depending on which areas are open to the scallop fishery in FY2016. In addition to No Action, the PDT developed three different allocations options to determine the overall number of trips, and three area alternatives to determine the number of trips per area.

2.2.3.1 LAGC AA Allocations (total number of fleetwide trips)

Table 16 summarizes the range of LAGC access area allocations considered. Each option is based on a different method, some of which have been used in previous years.

2.2.3.1.1 LAGC AA Allocation Option 1 – No Action (602 trips)

This option is the number of trips the LAGC fishery would receive under No Action, or default measures for FY2016 approved in Framework 26.

2.2.3.1.2 LAGC AA Allocation Option 2 – Same AA proportion as LA (2,553 trips) (preferred alternative)

This option is based on applying the same proportion of total catch coming from access areas for the overall fishery. For example, under the base run 34% of the total projected catch is from access areas and 66% is from open areas. Therefore if the same 34% is applied to the overall

LAGC IFQ allocation (4.47 million pounds) that equates to about 1.5 million pounds or 2,553 trips at 600 pounds per trip. This is the method that was used in Framework 26 when open area catches were lower than access areas.

2.2.3.1.3 LAGC AA Allocation Option 3 – Same overall allocation of 5.5% (1,523 trips)

This option is based on applying the same allocation value for the overall ABC/ACL, which is 5.5% for the LAGC fishery. When 5.5% is applied to the overall LAGC IFQ allocation for FY2016 that equates to about 900,000 pounds or 1,523 trips. This method has been used in previous actions.

2.2.3.1.4 LACG AA Allocation Option 4 – same as FY2015 (2,065 trips)

This option would allocate the same number of trips the LAGC IFQ fishery was awarded in FY2015. In FY2015 the LA fishery has the same allocation from access areas, the equivalent of 3 access area trips per FT LA vessel at 17,000 pounds per trip, and this alternative would maintain the same level of access the LAGC fishery had in 2015, about 1.2 million pounds or 2,065 trips.

2.2.3.2 LAGC AA Allocations (by area)

Table 17 summarizes the range of alternatives considered for the access areas that LAGC IFQ trips would be available from.

2.2.3.2.1 LAGC Access Area Option 1 – NL closed – all trips in MAAA

This option was developed in the event that NL was closed in FY2016 but rather than allocate LAGC IFQ trips from CA2south, those trips would be shifted to MAAA. CA2 south is relatively far from shore and it is currently not practical for most LAGC IFQ vessels to steam to that area for 600 pounds of scallops.

2.2.3.2.2 LAGC Access Area Option 2 – NL Open – Prorate the equivalent of CA2 trips to MAAA and NL evenly

This option was developed in the event that NL was open in FY2015. Relative to Specification Alternative 5 the areas that would be open are MAAA, CA2, and NL. The same proportion of catch per area would apply for the LAGC vessels, but the CA2 trips would be prorated into MAAA and NL evenly. Specifically, 88% of the total LAGC trips would be available in MAAA and 12% from NL.

2.2.3.2.3 LAGC Access Area Option 3 – NL Open – Prorate the equivalent of CA2 trips to NL only (preferred alternative)

This option was developed in the event that NL was open in FY2015. Relative to Specification Alternative 5 the areas that would be open are MAAA, CA2, and NL. The same proportion of catch per area would apply for the LAGC vessels, but rather than prorating the CA2 evenly between MAAA and NL, all CA2 trips would be shifted to NL. This option would increase the total amount available from NL to 19% of the total, leaving 81% of total trips from MAAA. This alternative was developed to increase the total amount of access area effort available from

NL. The majority of the access would still be from MAAA, but this would provide more opportunity for LAGC vessels from the north to fish in access areas closer to their homeports, compared to Options 2 and 1.

Table 16 – Summary of alternative under consideration for LAGC IFQ trip allocations in access areas in FY2015 (cell shaded green identifies the rationale for the alternative and how they differ)
Allocation Option 2 is the preferred alternative

	MT	Pounds	# Trips	% of AA catch	% of total LAGC catch	Rationale
Allocation Option 1	163.8	361,200	602	2.2%	8.1%	Default measures from FW26
Allocation Option 2	694.7	1,531,549	2,553	9.2%	34.2%	Same as FW26, total proportion of projected 2016 catch overall from AA (34%)
Allocation Option 3	414.5	913,893	1,523	5.5%	20.4%	Same as FW25/FW24/FW22
Allocation Option 4	562.5	1,240,114	2,065	7.5%	27.7%	Same number of AA trips allocated in 2015, LA vessels are receiving the same level of access in 2016 as in 2015
Area Option 1	If NL remains closed		100% in MA AA (CA2 would not be open to LAGC)			For runs with access in MAAA and CA2 only but prorate CA2 trips to MAAA
Area Option 2	If NL opens		88% of trips from MAAA and 12% of trips from NL			Prorate CA2 trips to MAAA and NL evenly
Area Option 3	If NL opens		81% of trips from MAAA and 19% from NL			Prorate CA2 trips to NL only
Total LAGC Allocation	***2,029***	***4,472,319***				

These values are based on total access area catch of about 7,500 mt or 16.6 million pounds.

Table 17 – Summary of trips and poundage for all LAGC AA allocation and area options
Allocation Option 2 and Area Option 3 are the preferred alternatives

				MAAA		CA2		NL	
	MT	Pounds	# Trips	trips	pounds	trips	pounds	trips	pounds
Allocation Option 1	163.8	361,200	602						
Allocation Option 2	694.7	1,531,549	2,553						
Area Option 1	100% in MA AA			2,553	1,531,549	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			2,246	1,347,763	0	0	306	183,786
Area Option 3	81% from MAAA, 19% from NL			2,068	1,240,555	0	0	485	290,994
Allocation Option 3	414.5	913,893	1,523						
Area Option 1	100% in MA AA			1,523	913,893	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			1,340	804,226	0	0	183	109,667
Area Option 3	81% from MAAA, 19% from NL			1,234	740,254	0	0	289	173,640
Allocation Option 4	562.5	1,240,114	2,065						
Area Option 1	100% in MA AA			2,065	1,240,114	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			1,817	1,091,300	0	0	248	148,814
Area Option 3	81% from MAAA, 19% from NL			1,673	1,004,492	0	0	392	235,622

2.2.4 Additional measures to reduce impacts on small scallops

In addition to closed areas there are other measures that reduce incidental mortality on small scallops (i.e. crew limits, prohibition on RSA compensation fishing, seasonal restrictions, and gear modifications). These potential measures were discussed and the only alternatives developed in this action are related to potential restrictions for RSA compensation fishing.

2.2.4.1 Alternative 1 - No Action (Default – RSA comp restricted to open areas)

RSA compensation fishing would be restricted to open areas only. Vessels with RSA poundage would not be allowed to harvest RSA compensation from access areas.

2.2.4.2 Alternative 2 - Status Quo – RSA in any area open to the scallop fishery

RSA compensation fishing would be permitted from any area open to the scallop fishery, including open areas and any access areas opened in this action. Vessels with RSA poundage could harvest RSA compensation from any area open to the scallop fishery.

2.2.4.3 Alternative 3 - Prohibit RSA compensation fishing in NL access area, if open (preferred alternative)

RSA compensation fishing would be permitted from any area open to the scallop fishery, with the exception of NL, if opened by this action. This provision has been used in the past to reduce impacts on small scallops and overall mortality in that area because it is traditionally a very attractive area to fish RSA poundage due to proximity to major ports (i.e. New Bedford).

3.0 CONSIDERED AND REJECTED ALTERNATIVES

3.1 CLOSURE OF HUDSON CANYON

The PDT discussed a potential closure of HC, potentially starting on August 1, 2016, to protect smaller scallops distributed throughout that area. The small scallops in that area are not as concentrated as in parts on ETA. The smaller scallops are expected to grow in the spring and summer and will be more susceptible to the gear later in the fishing year so a closure could increase overall yield and reduce mortality if access is delayed until the following year.

Rationale for rejection: The AP was not very supportive of this alternative based on concerns that flexibility with MA access area allocations is important. There were observations of a parasitic worm in Delmarva in the fishery in 2015 so most vessels avoided the area and fished their 2015 allocations in ETA and HC. If that issue persists in 2016 as well, there will be more limited places to fish within the MA access area. The PDT agreed that in 2016 flexibility will be important due to these uncertainties, especially if the ETA closure is expanded. Therefore, this alternative was not considered further in this action.

Figure 7 – Estimate of biomass from 2015 Habcam survey (color represents biomass larger than 75mm and contours indicate concentrations of smaller scallops, less than 75mm).

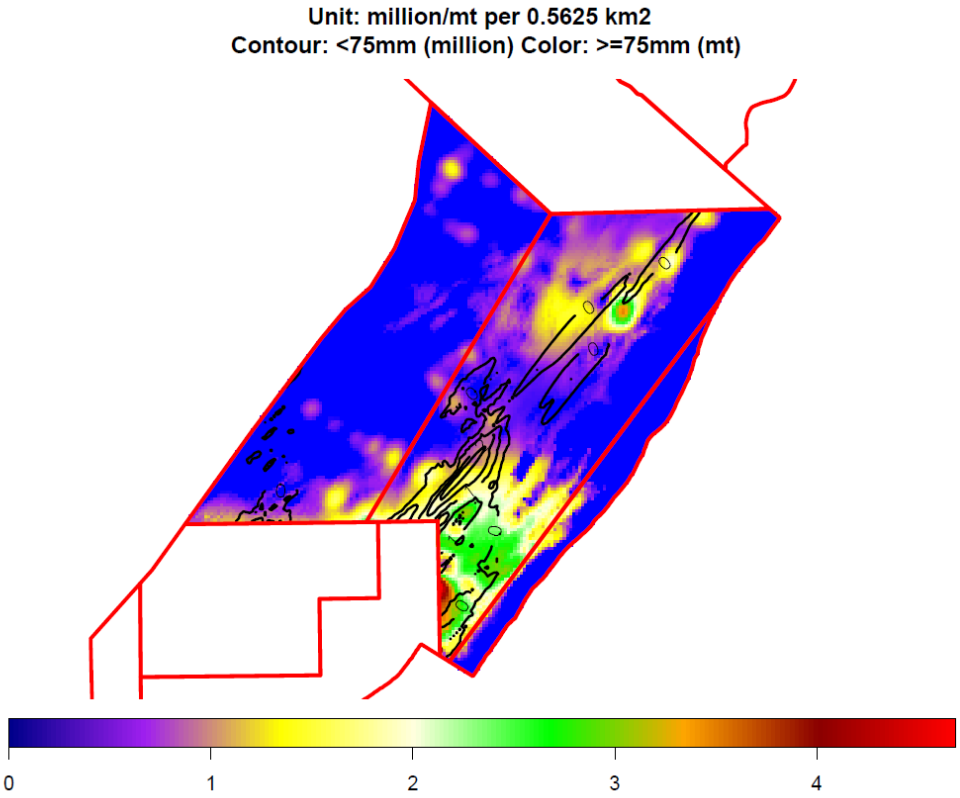


Figure 8 – Abundance of small scallops from 2015 SMAST survey in MA access areas

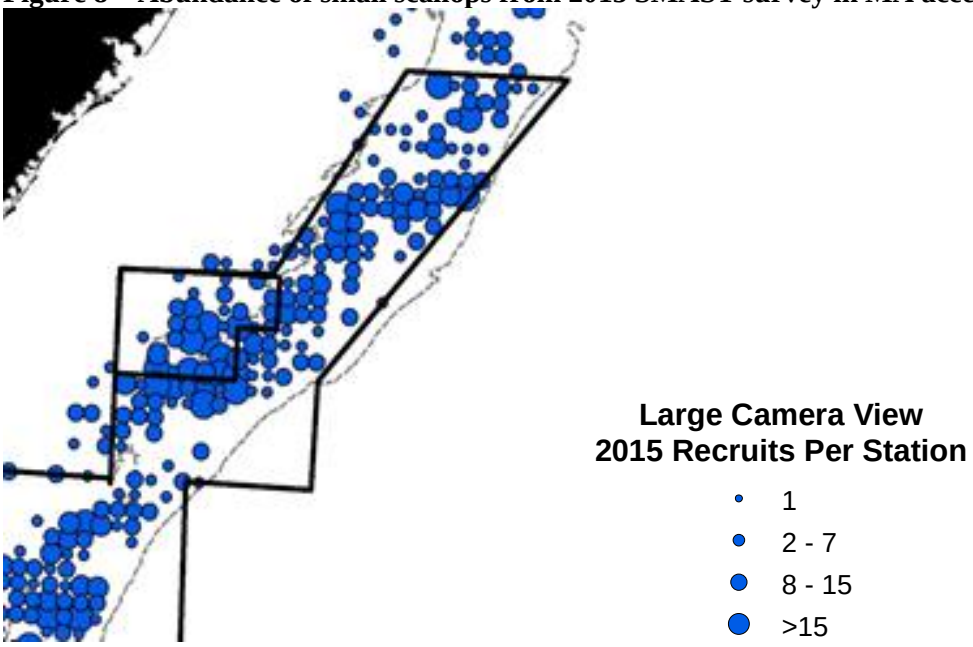
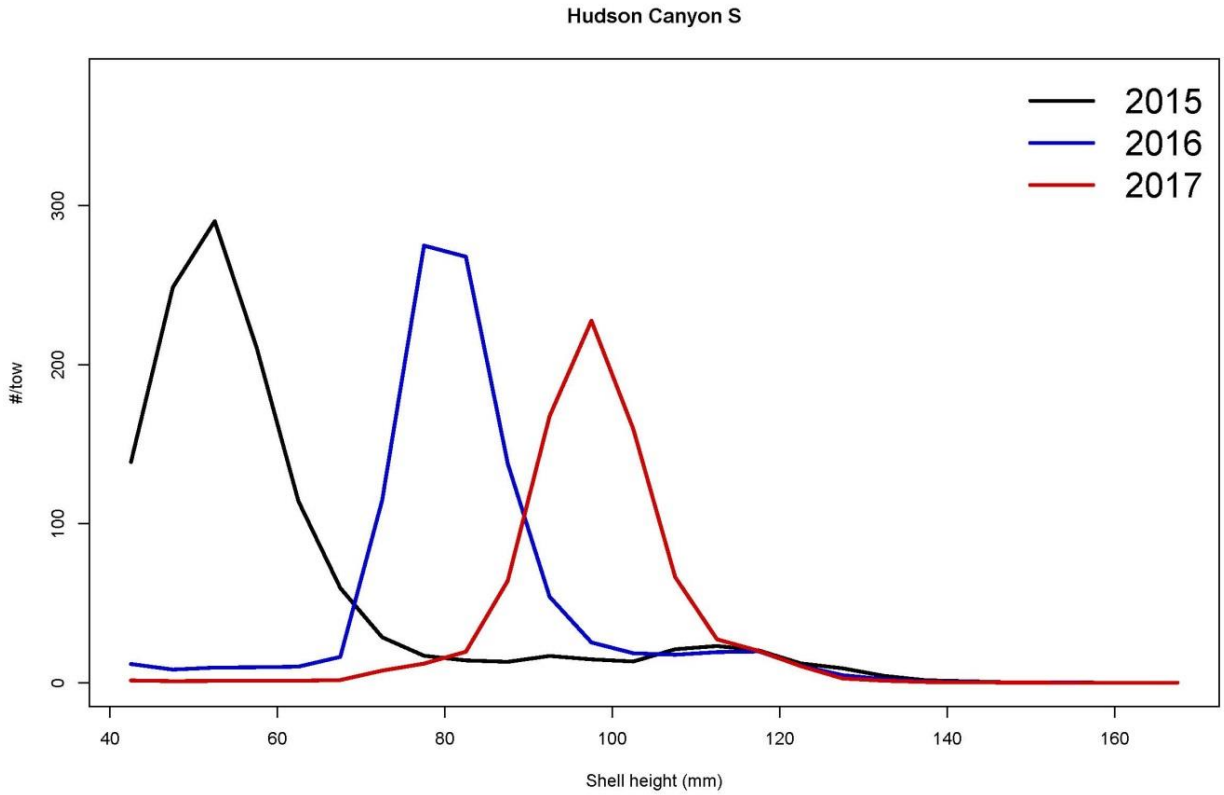


Figure 9 – Projected mean shell height frequencies for Hudson Canyon access area, 2015-2017



4.0 AFFECTED ENVIRONMENT

4.1 ATLANTIC SEA SCALLOP RESOURCE

The Atlantic sea scallop (*Placopetcen magellanicus*) is a bivalve mollusk that is distributed along the continental shelf, typically on sand and gravel bottoms from the Gulf of St. Lawrence to North Carolina (Hart and Chute, 2004). The species generally inhabit waters less than 20^{o} C and depths that range from 30-110 m on Georges Bank, 20-80 m in the Mid-Atlantic, and less than 40 m in the near-shore waters of the Gulf of Maine. Although all sea scallops in the US EEZ are managed as a single stock per Amendment 10, assessments focus on two main parts of the stock and fishery that contain the largest concentrations of sea scallops: Georges Bank and the Mid-Atlantic, which are combined to evaluate the status of the whole stock.

The scallop assessment is a very data rich assessment. The overall biomass and recruitment information are based on results from several surveys including: the NEFSC federal survey; SMAST video survey; VIMS paired tow dredge survey; and towed camera survey conducted by Arnie's Fishery. These data sources are combined in the assessment of the resource and in models used by the Scallop PDT to set fishery allocations.

4.1.1 Benchmark Assessment

The sea scallop resource just had a benchmark assessment in 2014 (SARC59, 2014). Therefore, all of the data and models used to assess the stock were reviewed. The final results from that assessment have been incorporated into the overall FMP including the updated reference points for status determination (See Section 4.1.1 of Framework 26 for details). The full benchmark assessment and summary report can be found at: http://www.nefsc.noaa.gov/publications/crd/crd1409/ .

Overfishing is occurring if F is above Fsmy, and the stock is considered overfished if biomass is less than ½ Bmsy. The previous estimate of Fmsy was 0.38 and Bmsy was 125K mt (1/2 Bmsy = 62K mt). SARC59 revised these reference points and increased Fmsy to 0.48 and reduced Bmsy to 96,480 mt (½ Bmsy = 48,240 mt). A comparison of the reference points are described in Table 18.

Table 18 – Summary of old and new reference points

	SARC 50 (2010)	SARC 59 (2014)
OFL	F = 0.38	F = 0.48
ABC/ACL (25% chance of exceeding OFL)	F = 0.32	F = 0.38
ACT for LA fishery (25% chance of exceeding ABC)	F = 0.28	F = 0.34
Bmsy (1/2 Bmsy)	125,358 (62,679)	96,480 (48,240)

SARC 59 included a formal stock status update through FY2013, and the reference points were updated in this benchmark assessment. **The updated estimates for 2013 are: F=0.32 and B=132K, so the stock is not overfished and overfishing is not occurring, under both the old and new reference points** (Figure 11 and Table 19). The main driver for the increase in Fmsy is due to increases in natural mortality and weakening of MA stock recruit relationships. In general Fmsy is uncertain because the Fmsy curve for MA is very flat, it is uncertain where Fmax is for that region.

Figure 10 - Whole stock estimate of fishing mortality through 2013 (SARC59) Fishing mortality (red line) and biomass estimates (y^{-1}, gray bars) from the CASA model

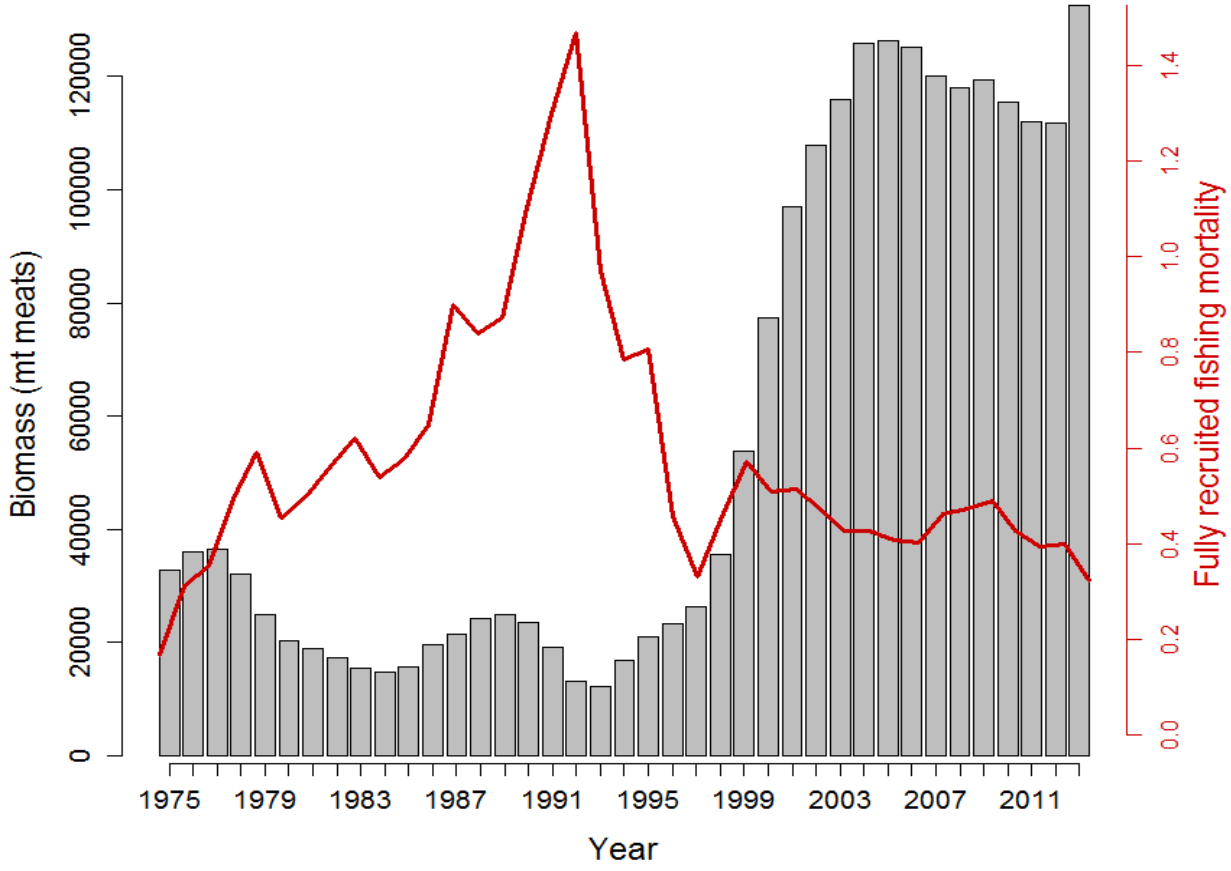


Figure 11 – Fully recruited annual fishing mortality rate for scallops from 1975-2013
Note that trends are different for partially recruited scallops because of changes in commercial size selectivity. SARC59 Fmsy is shown with green dashed line for the most recent period; Fmsy would have been smaller in past years when selectivity was different.

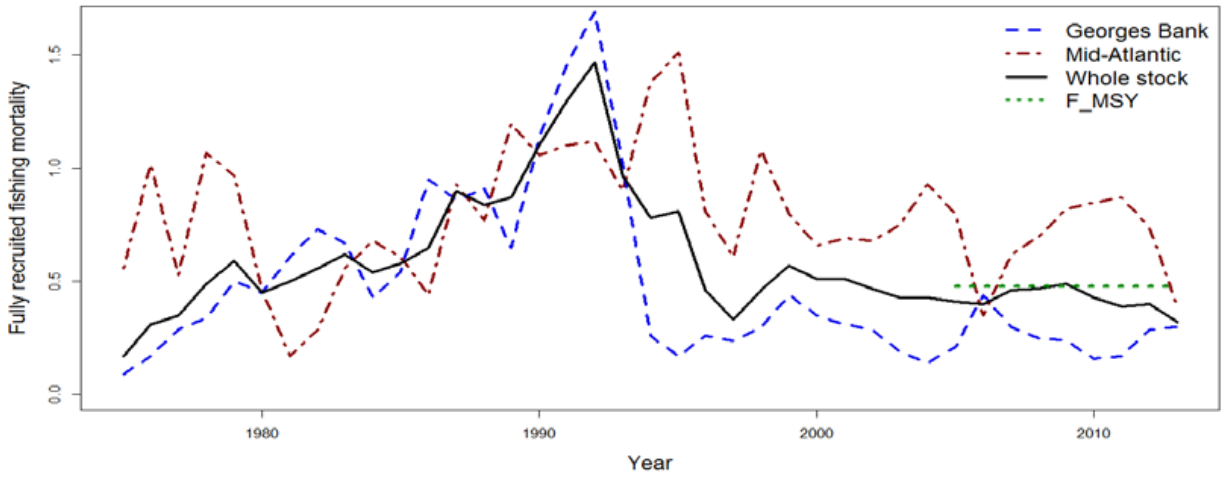
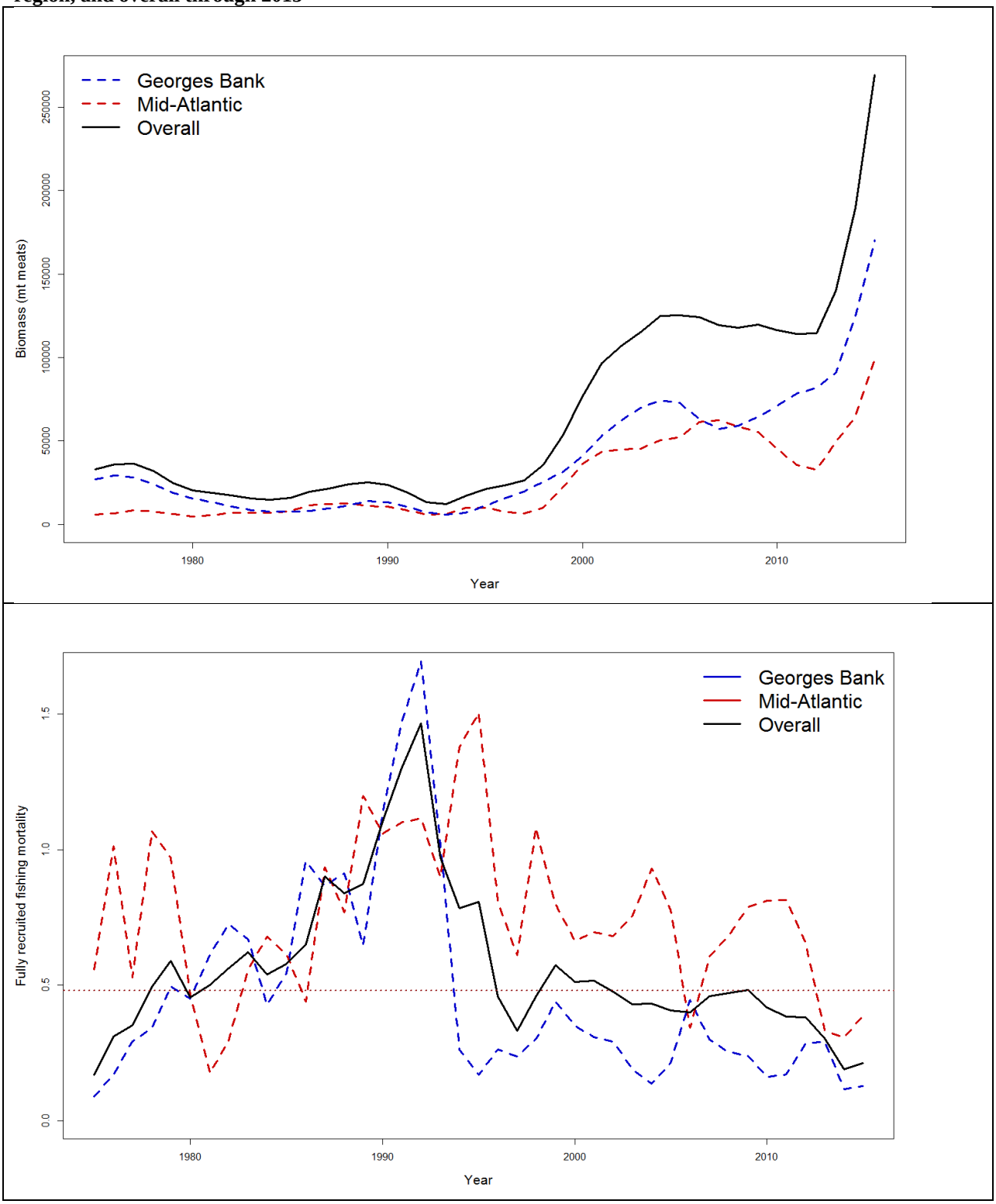


Table 19 – 2013 sea scallop stock status – overfishing is not occurring and the resource is not overfished

	Total 2013 Estimate	Stock Status Reference Points
Biomass (in 1000 mt)	133	½ Bmsy = 48,240
F	0.32	OFL = 0.48

The PDT updated the estimate of fishing mortality and biomass for this action adding survey and fishery data for 2014 and 2015. Since the 2015 fishing year is not over yet an estimate of total landings was used (38 million pounds). The total biomass in 2015 estimated from survey data is 196,728 mt, which is above the target, and fishing mortality is estimated at 0.43, which is below the target, but an increase from 2013. **Therefore, the stock is not overfished and overfishing is not occurring.**

Figure 12 – CASA model estimates of biomass (top) and fishing mortality (bottom) for GB, Mid-Atlantic region, and overall through 2015



4.1.2 Summary of 2015 surveys

The Scallop FMP is fortunate to have access to several different survey methods. First, the NEFSC has had a dedicated dredge survey since 1977 that has sampled the resource using a stratified random design. More recently, the NEFSC scallop survey has evolved into a combined dredge and optical survey (Habcam Version 4), and is conducted on the R/V Sharp. Ideally, both dredge tows and habcam data are collected in each stratum, and there are three separate legs of the combined federal scallop survey. In 2015, the federal dredge portion of the survey was on GB only (Figure 13) and the Habcam portion of the survey was completed in both MA and GB (Figure 14).

In addition, SMAST has conducted video surveys of various parts of the resource area. In most years since 2003, including 2015, SMAST completed a broadscale video survey of most of the resource area. In 2015 SMAST was awarded two RSA awards to conduct a broadscale survey of the resource on Georges Bank, in both open and access areas, as well as an intensive survey of the access area in CA2 south. In addition, SMAST conducted a broadscale survey of the Mid-Atlantic region that was funded by industry donations and reserve funds (Figure 15).

Third, VIMS conducts a dredge survey with two dredges, one commercial dredge and one survey dredge. The survey areas vary by year, and in 2015 VIMS was awarded and RSA grant to survey the Mid-Atlantic region in both access and open areas (Figure 16). The 2015 VIMS survey were completed on three separate legs in May and June, including about 600 stations. This year the VIMS dredge survey changed the sampling design from a traditional grid to a stratified random design. It covered the NMFS shellfish strata as well as some additional areas (specifically deeper waters in ETA and Delmarva and both south and west of the shellfish strata in Delmarva). Several new vessels were used in addition to more veteran vessels to this survey, so the survey included some calibration work for the new vessels. Sampling intensity of SH: MW was extended to monitor presence of nematode observed by fishing vessels earlier in the year (about 5,000 samples from all stations with scallops – about 10-15 per station). Currently, the PDT suspects this parasitic nematode is *Sulcascaris sulcate*. That species has a life cycle with two host, sea turtles and mollusks. The prevalence was higher in areas farther south (Figure 17), as well as the intensity of parasites per affected animal.

There is not much known about this parasite in this region, and the PDT plans to continue to monitor the prevalence of this parasite and more research is scheduled. Based on information provided by individuals at meetings a parasite with similar characteristics showed up in scallop meats in 2003 and quickly disappeared after that. The fishery did seem to avoid the area with observed parasites in Delmarva during the 2015 fishing year (Figure 48 - Figure 50), so fishing behavior was somewhat affected. However, there is no evidence at this time that this parasite will persist or change the range of the impacts in this action. To acknowledge that this parasite may still persist in 2016, the PDT used a relative low fishing mortality threshold for Delmarva to set fishery allocations. Therefore, if the fishery continues to avoid that area, the realized fishing mortality will not be much lower than projections.

Finally, Arnie's Fisheries has completed very intensive optical surveys of discrete areas using Habcam Version 2. The areas vary from year to year, and in 2015 the group was awarded RSA funding to survey the NL and southern flank of GB as well as a late season survey of the Elephant Trunk access area. The Elephant Trunk survey is scheduled for September to evaluate biomass in the area later in the year after fishing has occurred. The final results from that fall survey will not be integrated into the biomass estimates for the area, but general maps are expected to confirm areas of higher biomass before the fishery begins in 2016. The survey of the southern flank of GB was completed in May (Figure 18).

Figure 13 – 2015 NEFSC dredge survey of GB

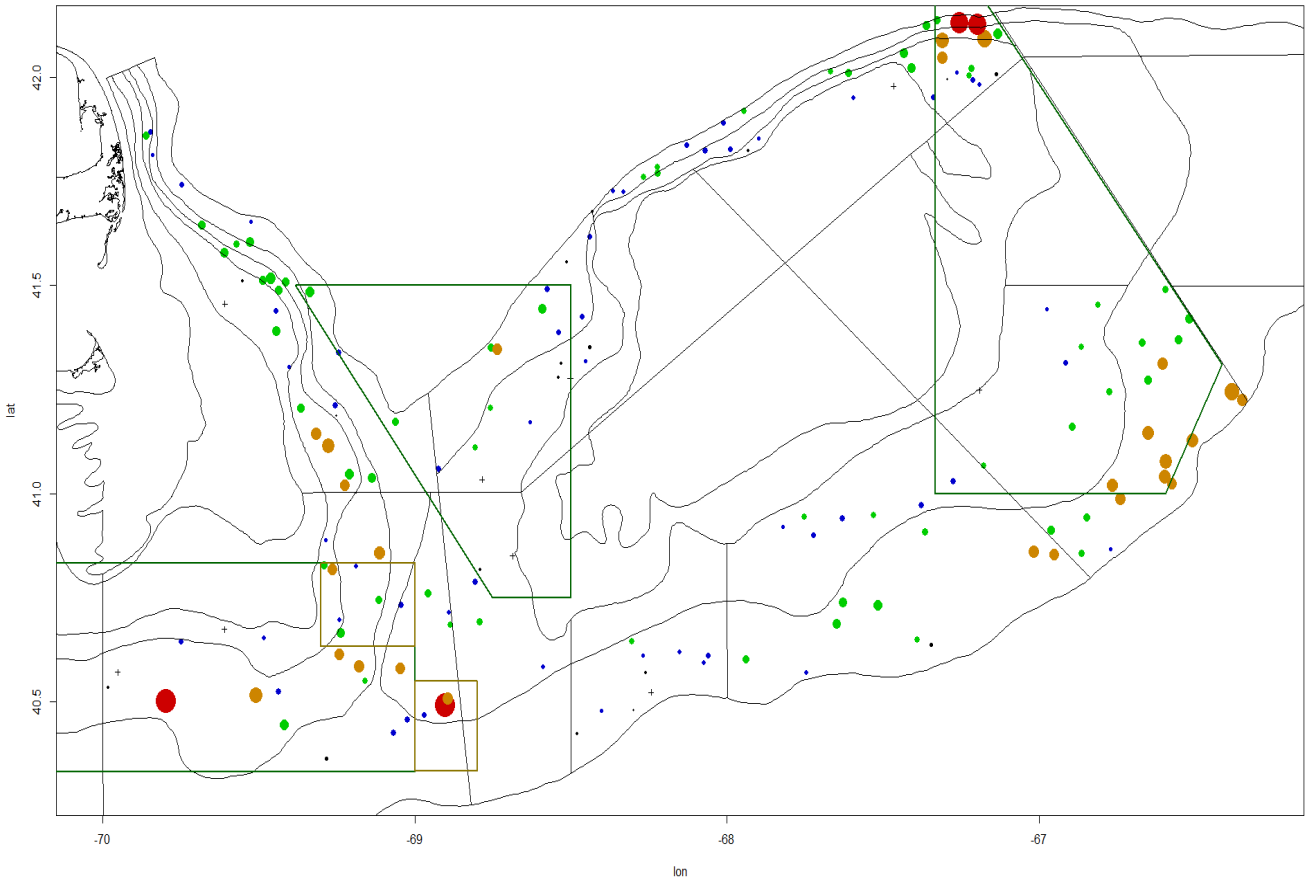


Figure 14 – 2015 Habcam survey (Federal v4 and Arnie's Fishery v2 combined)

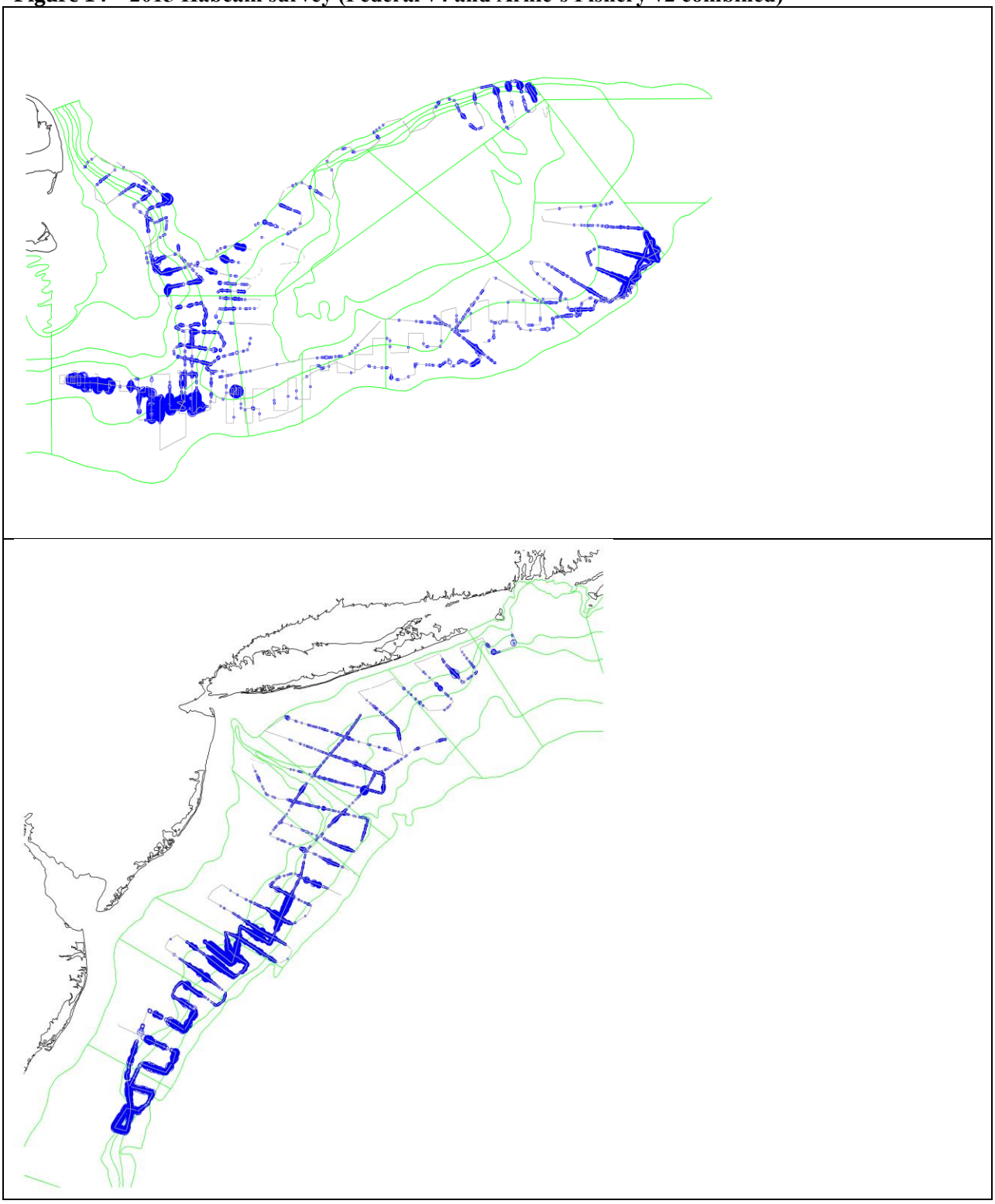


Figure 15 – 2015 survey stations for SMAST camera survey

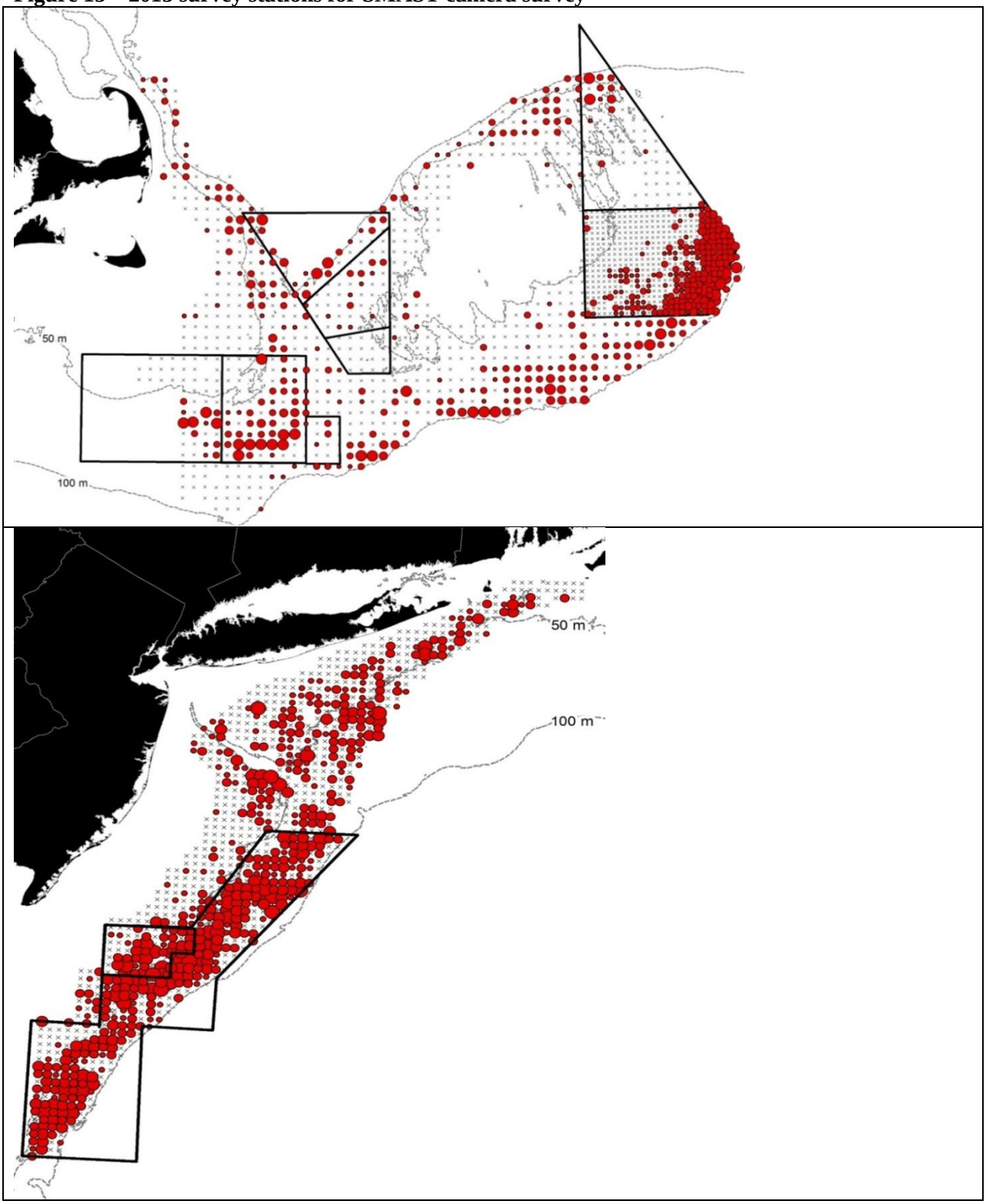


Figure 16 – 2015 VIMS dredge survey of MA (numbers per tow)

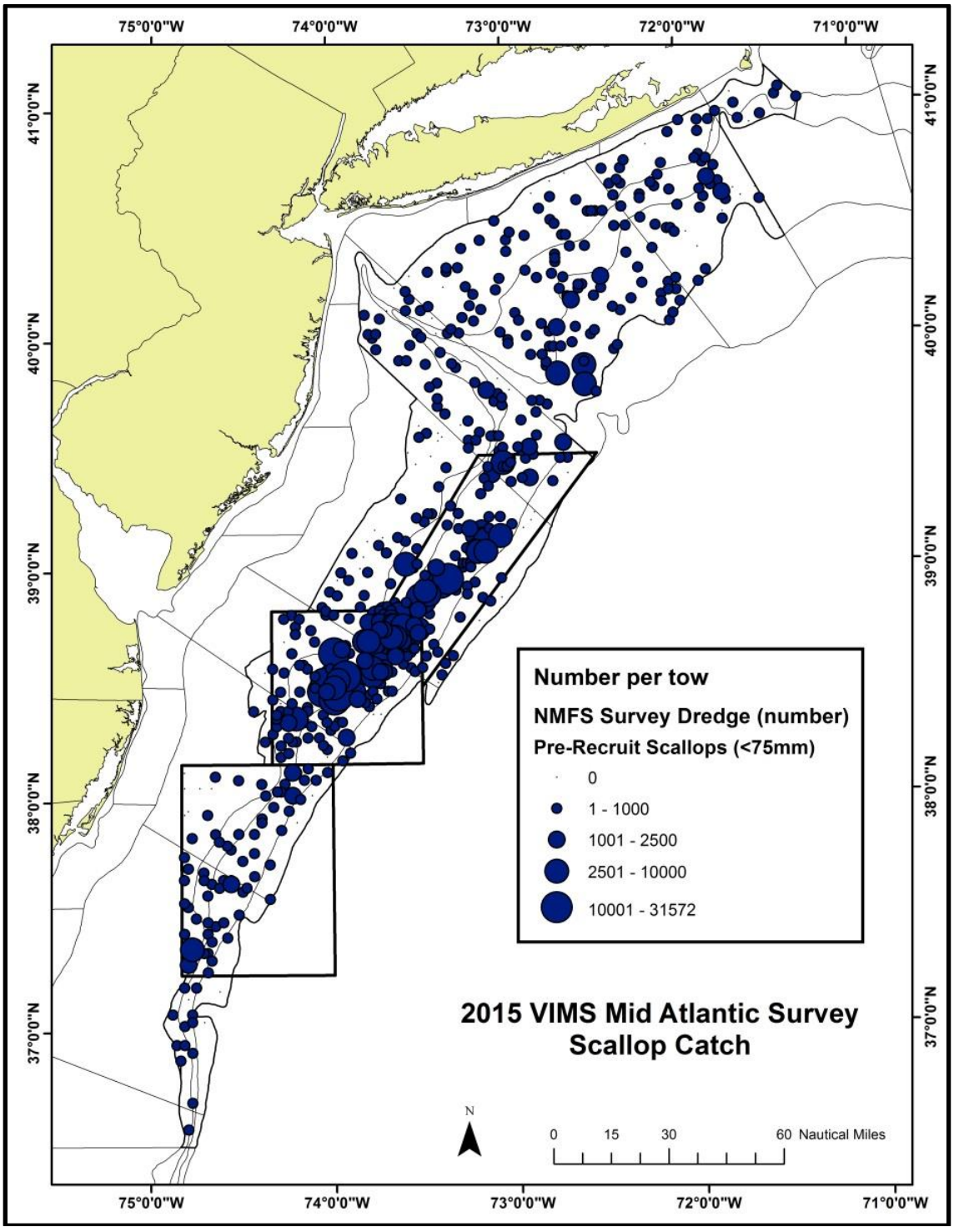


Figure 17 – Prevalence of suspected nematode parasite in 2015 VIMS dredge survey of MA (percent of animals sampled with parasite per station)

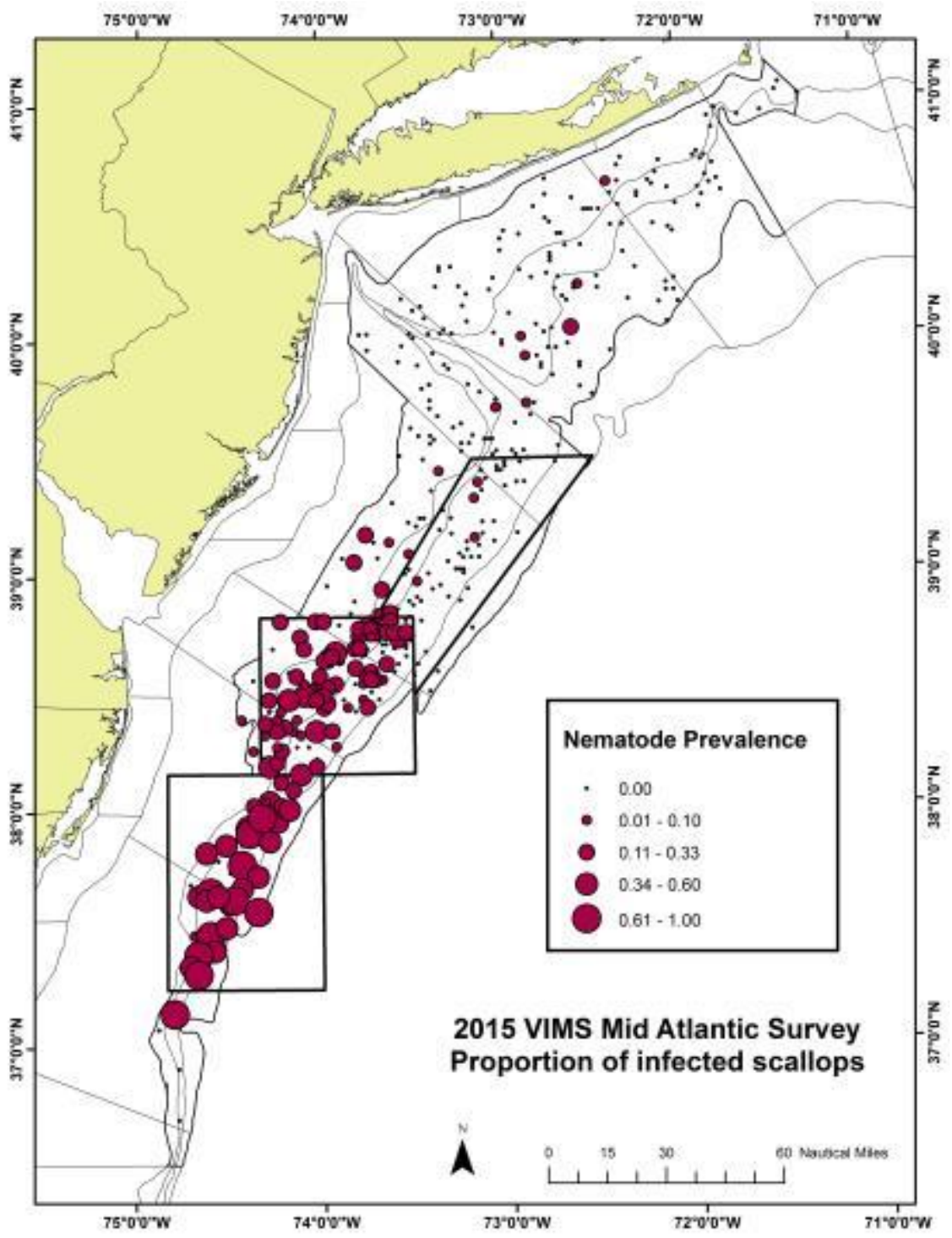
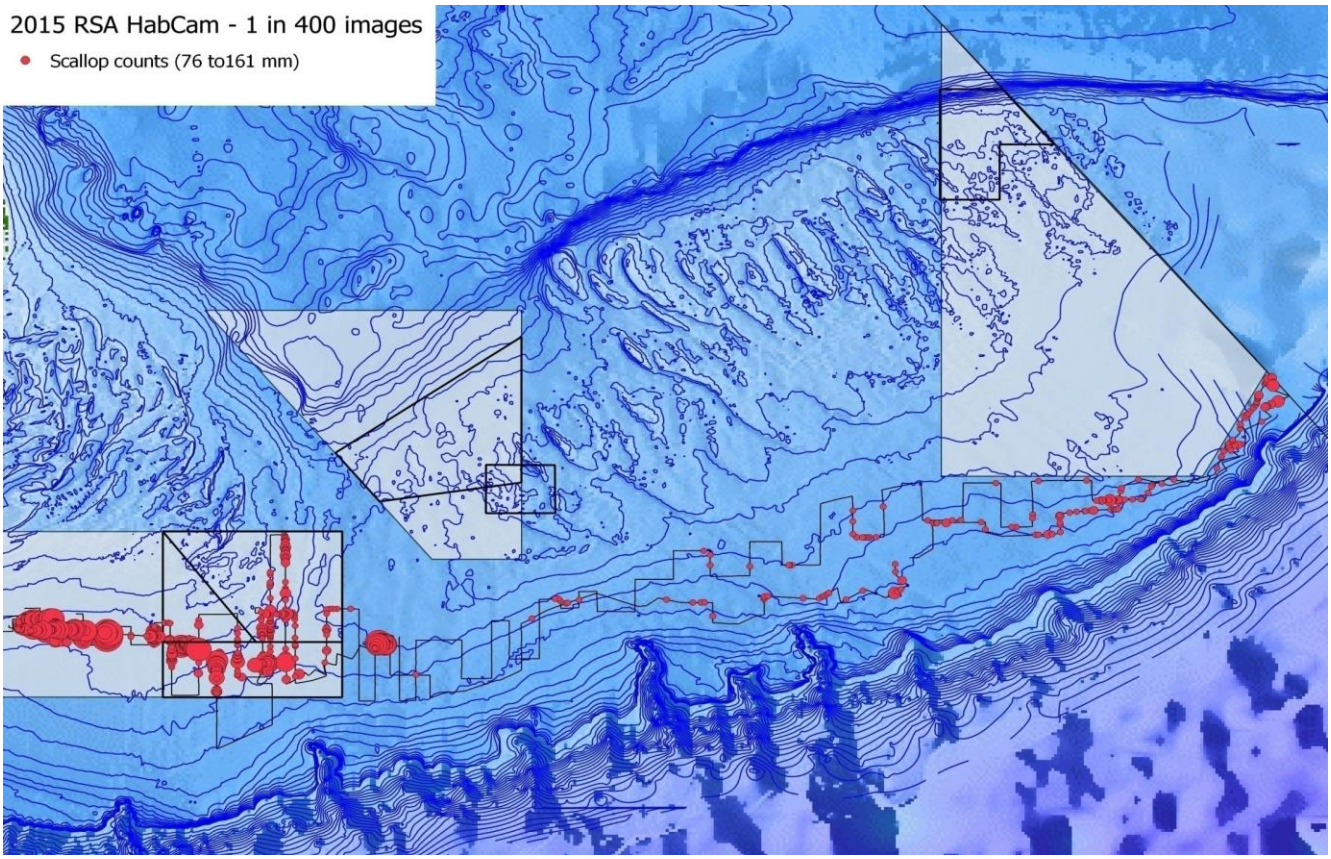


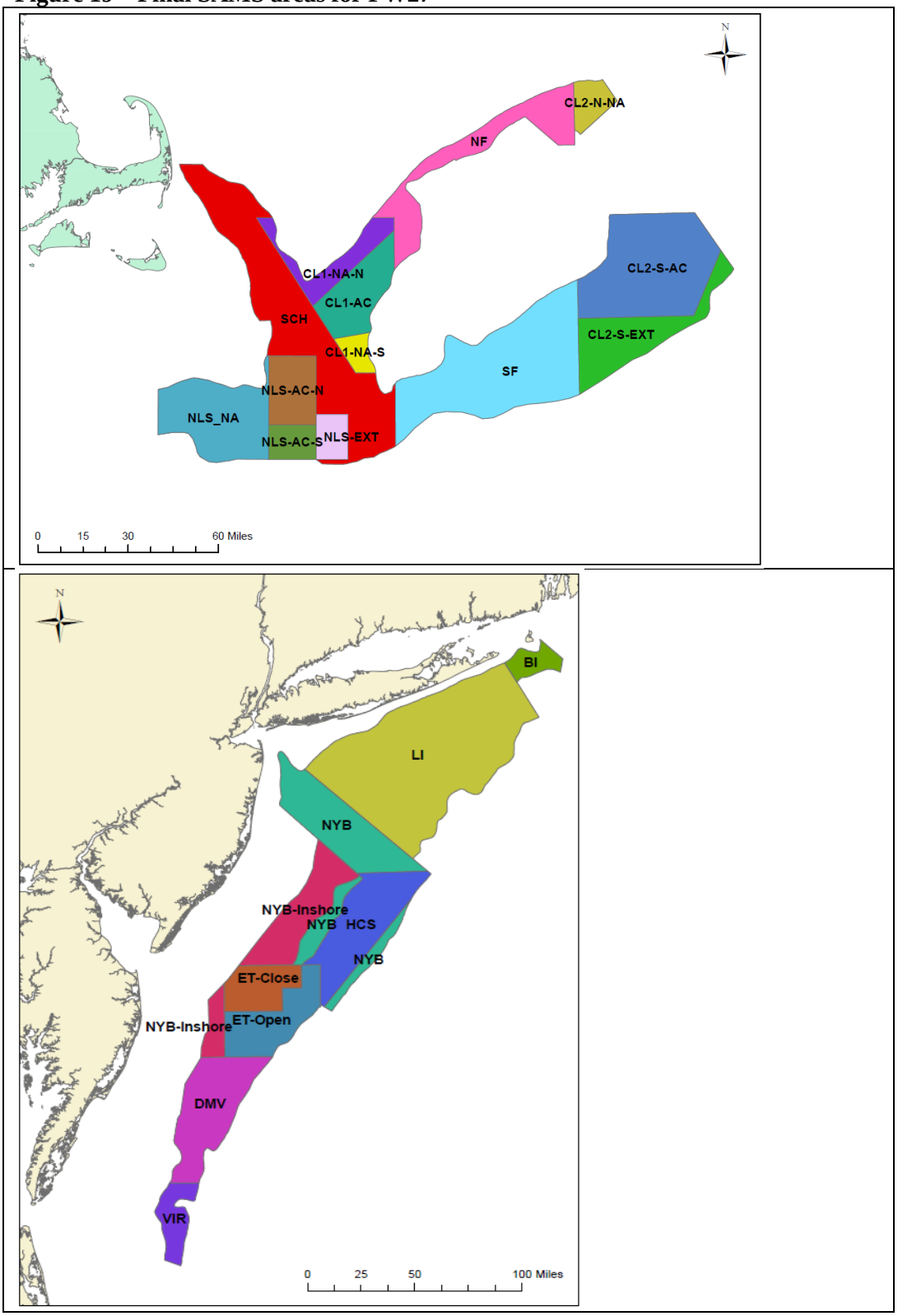
Figure 18 – 2015 Habcam Group survey of NL and southern flank of GB



4.1.3 Updated estimates of scallop biomass and recruitment

The Scallop PDT combines the results from all available surveys to estimate sea scallop biomass and recruitment on an annual basis. The PDT met on August 25, 2015 and reviewed results from all the surveys described above. Survey results were broken down into smaller areas used for management (SAMS areas). Ultimately all survey results are combined per area, Table 20. Note that some corrections were made to the SMAST biomass estimates for several sub-areas. These corrections did not affect the specifications developed for FW27 because they were for areas that are not proposed to open to the fishery in 2016 (NL no access and NL Access South).

Figure 19 – Final SAMS areas for FW27



4.1.3.1 Georges Bank

The scallop abundance and biomass on Georges Bank increased from 1995-2000 after implementing closures and effort reduction measures. Biomass and abundance then declined from 2006-2008 because of poor recruitment and the reopening of portions of groundfish closed areas. Biomass increased on Georges Bank in both 2009 and 2010, mainly due to increased growth rates and strong recruitment in the Great South Channel, along with continuing concentrations on the Northern Edge and in the central portion of Closed Area I, especially just south of the "sliver" access area.

4.1.3.2 Mid-Atlantic

In general, Mid-Atlantic biomass was declining since 2009, and has been steadily increasing as smaller scallops grow. The decline in exploitable biomass from 2006-2014 was primarily from depletion of the large biomass in Elephant Trunk and several years of poor recruitment in that area (2009-2011). However, stronger recruitment has been observed in 2012 and 2013. Once these scallops grow larger biomass in the Mid-Atlantic is expected to increase. The large number of small scallops observed in 2012 in all three MA access areas seems to have survived, and some of these animals will be ready for harvest in FY2015. Note that another set of smaller scallops was observed in several surveys in more shallow areas within the MA access areas. Overall MA scallop biomass is increasing as smaller scallops continue to grow in this area

Table 20 – Summary of biomass estimates from 2015 surveys

Georges Bank	Dredge				SMAST Large			SMAST Small*		HabCam (v2 and v4)				Simple Mean		IVWMean	
	BMS (mt)	SE	SEdref	#Sta	BMS (mt)	SE	#Sta	corrected	SE	BMS (mt)	SE	SEmod	Photos	BMS (mt)	SE	BMS (mt)	SE
CL1ACC	229	75	75	9	546	230	40	1,915	920	2,083	120	208	3,509	952	106	449	67
CL1NA	2,063	798	799	9	5,270	3,144	25	4,577	3,584	8,739	1,337	1,337	2,256	5,357	1,170	3,885	670
CL-2(N)	5,923	2,087	2,091	14	3,787	1,571	13	5,309	1,720	4,706	235	471	1,629	4,805	886	4,688	441
CL-2(S)	9,805	3,092	3,099	19	6,320	676	432	9,916	1,123	6,542	183	654	8,162	7,556	1,079	6,511	465
CL-2Ext	12,202	7,763	7,767	11	3,033	627	51	3,518	868	5,180	114	518	3,427	6,805	2,603	4,330	399
NLSAccN	2,065	821	822	14	2,819	847	30	3,633	1,411	4,202	155	420	3,160	3,029	418	3,606	342
NLSAccS	NS				18,111	8,053	15	33,799	15,279	23,849	1,029	2,385	732	20,980	4,199	23,387	2,287
NLSNA	8,174	7,698	7,699	5	38,041	15,735	51	58,801	23,046	66,706	8,051	8,051	1,367	37,640	6,426	36,344	5,246
NLS-Ext	7,093	8,486	8,487	2	143	82	15			2,194	9	219	649	3,143	2,830	395	77
South Channel	11,940	7,803	7,811	39	4,528	1,200	47	8,091	1,709	10,524	1,684	1,684	12,224	8,997	2,693	6,631	970
North Flank	1,020	253	254	25	6,074	401	143	6,628	1,936	2,016	644	644	3,462	3,037	267	2,421	203
South Flank	2,757	798	800	23	5,745	1,578	139	4,467	1,485	7,805	299	781	6,654	5,436	645	5,388	527
GB Open	**27,918**	**11,039**	**11,053**	**87**	**19,380**	**2,118**	**380**	**22,704**	**3,103**	**25,525**	**1,831**	**1,964**	**22,340**	**24,274**	**3,810**	**18,769**	**1,191**
GB Total	**63,269**	**16,381**	**16,430**	**170**	**94,417**	**18,180**	**1,001**	**140,654**	**28,180**	**144,547**	**8,435**	**8,795**	**47,231**	**107,738**	**9,218**	**98,032**	**5,929**
*Not used in estimation																	

Mid-Atlantic	Dredge (VIMS)				SMAST Large					HabCam (v4)				Simple Mean		IVWMean	
Subarea	Bms	SE	SEdref	#Sta	Bms	SE	#Sta			Bms	SE	SEmod	Photos	Mean	SE	IVWM	SE
Block Island	1,074	128	130	9	1,181	504	23			333	0	33	1,132	863	174	378	32
Long Island	19,805	959	1,038	161	12,512	2,439	313			26,231	2,067	2,623	14,234	19,516	1,243	20,674	901
New York Bight	8,557	499	527	73	8,445	2,105	124			10,093	466	1,009	9,653	9,032	798	8,886	447
NYB inshore	1,499	132	136	40	2,678	672	108			906	4	91	3,524	1,694	231	1,089	75
Hud. Can. S	16,187	1,024	1,074	81	15,698	1,961	122			14,666	1,495	1,495	8,794	15,517	897	15,669	845
ET Access	19,255	833	918	67	25,525	7,641	79			30,257	1,999	3,026	11,057	25,013	2,756	20,183	803
ET Closed	10,928	729	761	67	24,204	10,975	58			19,985	872	1,998	8,018	18,372	3,727	12,075	685
Delmarva	10,210	752	779	71	11,884	1,581	113			26,271	1,051	2,627	5,938	16,122	1,055	11,508	723
Virgina	128	14	14	15	NS					NS				128	14	128	14
MA Open	**31,063**	**1,096**	**1,260**	**298**	**24,816**	**3,329**	**568**			**37,562**	**2,119**	**2,812**	**28,543**	**31,232**	**1,505**	**31,155**	**1,009**
MA Access (not including ETA Closed)	**45,652**	**1,520**	**1,773**	**219**	**53,107**	**8,045**	**314**			**71,194**	**2,709**	**4,277**	**25,789**	**56,651**	**3,084**	**47,360**	**1,372**
MA Total	**87,643**	**2,011**	**2,138**	**584**	**102,127**	**14,009**	**940**			**128,742**	**3,548**	**5,495**	**62,350**	**106,256**	**5,067**	**90,590**	**1,835**

4.1.4 Performance of ACL management

In the first year under ACL management, fishery allocations essentially kept landings right below ACL (landings 97% of ACL). In 2012 and 2013 landings were closer to 90% of the ACL. This is not surprising since fishery allocations are actually set at ACT, a substantially lower level to account for management uncertainty. For example, in 2014 the ACT for the LA fishery was 15,567mt and the LA ACL was 18,885, about a 3,000mt buffer. Total landings in 2014 were about 14,500 mt (32 million pounds) including all landings from LA and LAGC vessels. Realized catch was much lower than ACL for this fishing year, about 70%, of the total projected catch of 17,327 mt (about 38 million pounds). Catch being lower than projections is potentially driven by a handful of reasons: LPUE may be lower in open areas than projected, in the past projections of catch per day were underestimated by the model used by the PDT and the model may be getting closer to realized catch levels, or biomass and or meat weights were not as high as estimated, etc.

Overall, the scallop fishery has stayed below catch limits set by the FMP since adoption of ACL management in Amendment 15 (2011). In 2014, the most recent year with final data available the fishery came in about six million pounds under the annual catch limit. While that is not much lower compared to other fisheries, six million pounds is potentially worth about $70 million dollars under current prices. Furthermore, this trend may be the case for FY2015 as well; current estimates of total catch are likely to be lower than annual catch limits.

Table 21 – Summary of allocations compared to actual landings (2011-2014)

		Allocated		% of Total Allocated	Actual		% Difference (allocated vs actual)	% of Total Actual
		mt	lb		mt	lb		
2011	OFL	32,387	71,401,113					81.88%
	ABC/ACL	27,269	60,117,854					97.24%
	Total Projected Landings	23,723	52,300,000		26,518	58,461,465	112%	
	incidental	23	50,000	0.10%	18	38,700	77%	0.07%
	RSA	567	1,250,000	2.39%	553	1,218,781	98%	2.08%
	OBS	273	601,170	1.15%	104	228,370	38%	0.39%
	IFQ	1,452	3,201,880	6.12%	1,382	3,046,245	95%	5.21%
	LA ACT	21,431	47,247,267	90.34%	24,462	53,929,369	114%	92.25%
	LA ACL				24,462	53,929,369		
2012	OFL	34,382	75,799,335					75.33%
	ABC/ACL	28,961	63,848,076					89.43%
	Total Projected Landings	25,945	57,200,000		25,900	57,098,684	100%	
	incidental	23	50,000	0.09%	28	61,869	124%	0.11%
	RSA	567	1,250,000	2.19%	529	1,167,316	93%	2.04%
	OBS	290	638,470	1.12%	120	263,700	41%	0.46%
	IFQ	1,544	3,405,000	5.95%	1,511	3,331,284	98%	5.83%
	LA ACT	23,546	51,910,044	90.75%	23,711	52,274,515	101%	91.55%
	LA ACL	26,537	58,503,960					
2013	OFL	31,555	69,566,867					57.22%
	ABC/ACL	21,004	46,305,894					85.97%
	Total Projected Landings	17,335	38,216,741		18,056	39,807,589	104%	
	incidental	23	50,000	0.13%	21	47,337	95%	0.12%
	RSA	567	1,250,000	3.27%	553	1,218,204	97%	3.06%
	OBS	210	463,059	1.21%	174	384,545	83%	0.97%
	IFQ	1,111	2,449,856	6.41%	1,095	2,414,256	99%	6.06%
	LA ACT	15,324	33,783,637	88.40%	16,213	35,743,247	106%	89.79%
	LA ACL	19,093	42,092,979		16,213	35,743,247		
2014	OFL	30,419	67,062,415		0			47.75%
	ABC/ACL	20,782	45,816,467		0			69.89%
	Total Projected Landings	17,327	38,463,656		14,524	32,020,980	83%	
	incidental	23	50,000	0.13%	19	42,107	84%	0.13%
	RSA	567	1,250,000	3.27%	433	954,011	76%	2.98%
	OBS	237	458,562	1.37%	177	390,579	85%	1.22%
	IFQ	1,099	2,423,145	6.34%	948	2,089,589	86%	6.53%
	LA ACT	15,567	34,319,360	89.84%	12,948	28,544,694	83%	89.14%
	LA ACL	18,885	41,634,305		12,948	28,544,694		

Source: Year-end reports provided by National Marine Fisheries Service

4.1.5 Northern Gulf of Maine

The scallop resource in the GOM varies widely with sporadic booms and busts. The qualification period adopted under Amendment 11 for the general category IFQ fishery did not overlap with a period of high scallop abundance in the GOM (FY2000-2004). Therefore, a separate limited entry program was adopted in Amendment 11 with a longer qualification period and no landings history requirement, but more conservative fishing measures including lower possession limits and more restrictive gear requirements. The LAGC Northern Gulf of Maine (NGOM) permit was established and about 125 permits were issued in 2010.

Only a fraction of these permits are active, under 15 vessels, and until more recently total NGOM catches were below 10,000 pounds most years, or 10-15% of the total TAC of 70,000 pounds (Table 60). In FY2013 catch increased in both federal and state waters within the NGOM. In terms of federal waters, total catch has increased primarily from increased fishing on Platt's Bank (Figure 43).

4.2 PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

The Northeast U.S. Shelf Ecosystem includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream to a depth of 2,000 m (Figure 20, Sherman et al. 1996). Four distinct sub-regions are identified: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The physical oceanography and biota of these regions were described in the Scallop Amendment 11. Much of this information was extracted from Stevenson et al. (2004), and the reader is referred to this document and sources referenced therein for additional information. Primarily relevant to the scallop fishery are Georges Bank and the Mid-Atlantic Bight, although some fishing also occurs in the Gulf of Maine. The link with more information about the EFH description for Atlantic sea scallop can be found at: http://www.nero.noaa.gov/hcd/scallops.pdf.

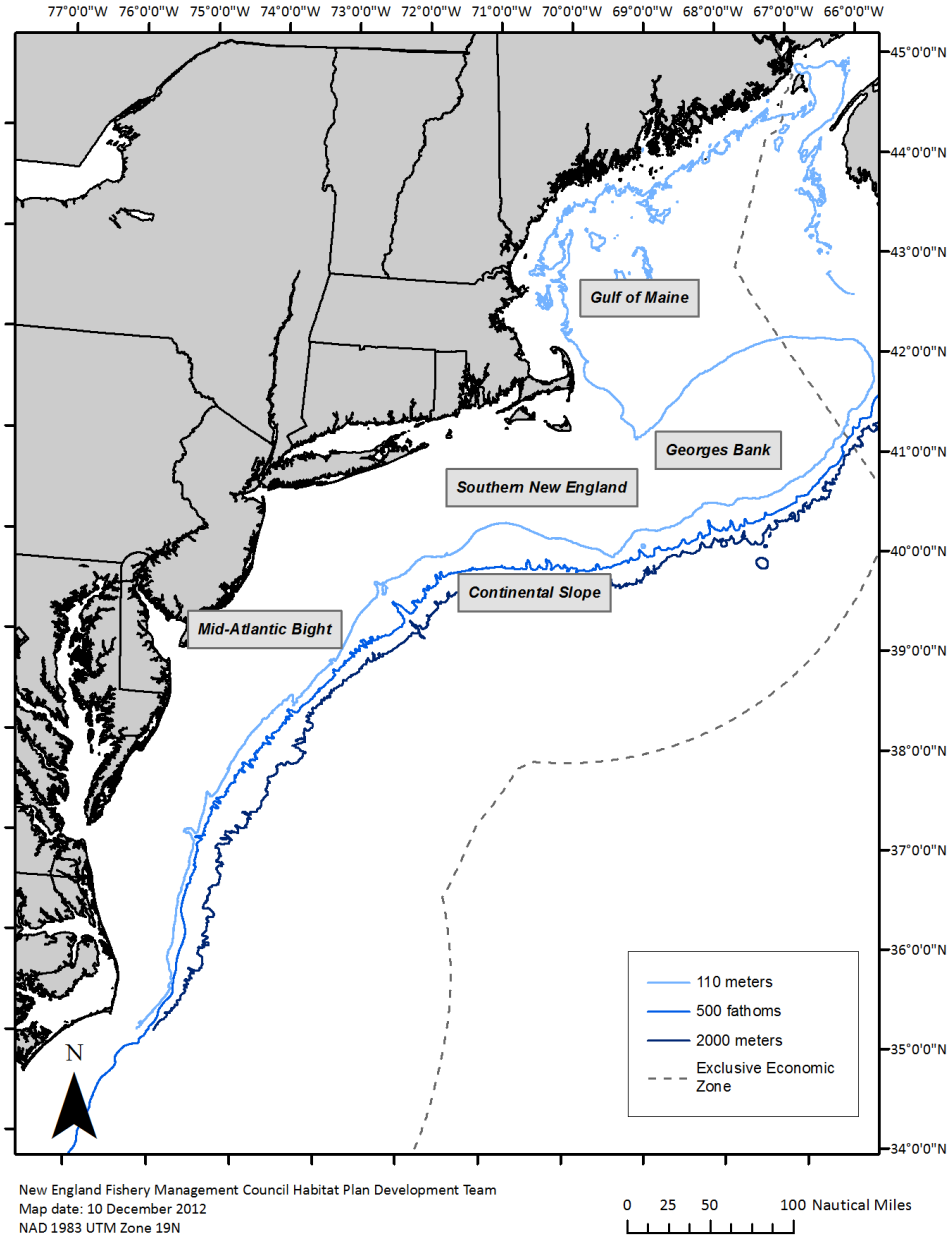
The Atlantic sea scallop fishery is prosecuted in concentrated areas in and around Georges Bank and off the Mid-Atlantic coast, in waters extending from the near-coast out to the edge of the continental shelf. Atlantic sea scallops occur primarily in depths less than 110 meters on sand, gravel, shells, and cobble substrates (Hart et al. 2004). This area, which could potentially be affected by the preferred alternative, has been identified as EFH for various species. These species include American plaice, Atlantic cod, Atlantic halibut, Atlantic herring, Atlantic sea scallop, Atlantic surfclam, Atlantic wolfish, barndoor skate, black sea bass, clearnose skate, haddock, little skate, longfin squid, monkfish, ocean pout, ocean quahog, pollock, red hake, redfish, rosette skate, scup, silver hake, smooth skate, summer flounder, thorny skate, tilefish, white hake, windowpane flounder, winter flounder, witch flounder and yellowtail flounder. For more information on the geographic area, depth, and EFH description for each applicable life stage of these species, the reader is referred to Table 45 of the scallop Amendment 15 EIS.

Most of the current EFH designations were developed in NEFMC Essential Fish Habitat Omnibus Amendment 1 (1998). Most recently, Amendment 16 to the Northeast Multispecies FMP adds Atlantic wolfish to the management unit and includes an EFH designation for the species. For additional information, the reader is referred to the Omnibus Amendment and the other FMP documents listed in Table 28 of the scallop Amendment 15 EIS. In addition, summaries of EFH descriptions and maps for Northeast region species can be accessed at http://www.nero.noaa.gov/hcd/list.htm.

Designations for all species are being reviewed and updated in NEFMC Omnibus Essential Fish Habitat Amendment 2 (OA2). Another purpose of OA2 is to evaluate existing habitat management areas and develop new habitat management areas. To assist with this effort, the Habitat PDT developed an analytical approach to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities. This body of work, termed the Swept Area Seabed Impact approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH. The approach is detailed in this document, available on the Council webpage:

http://www.nefmc.org/habitat/planamen/efh_amend_2/appendices%20-%20dec2013/Appendix%20D%20-%20Swept%20Srea%20Seabed%20Impact%20approach.pdf.

Figure 20 – Northeast U.S Shelf Ecosystem and geographic extent of the US sea scallop fishery



The Council identified final recommendations for modifications to habitat management areas over two Council meetings, April 2015 and June 2015. That action is currently under review and is expected to be implemented in 2016. A summary of the Council's preferred recommendations can be found at www.nefmc.org, and Figure 21 and Figure 22 are included below with the final

recommendations for habitat management areas and seasonal spawning areas. **Note that these measures have not been approved; a proposed rule is expected in early 2016.**

Figure 21 – Preferred alternative year-round spatial management areas. Seasonal areas not shown.

-- Gear exemption areas hatched. In western Gulf of Maine, shrimp trawls exempt. In Great South Channel and Georges Shoal, clam dredges exempt for one year. On Northern Edge (red area), scallop access fishing exempt, bottom trawling for groundfish exempt west of 67° 20′ W.
-- Dedicated Habitat Research Areas are cross-hatched. Stellwagen DHRA (north), Georges Bank DHRA (south)
-- Mortality closures shown with heavy black outline. Current gear restrictions.
-- Largest shaded area is the roller gear restricted area.
-- Other shaded/colored areas are mobile bottom-tending gear closures, with gear exemptions as noted above.
-- Cox Ledge closed to clam dredges, and trawls cannot use ground cables.
-- Ammen Rock closed to all gears except lobster traps.

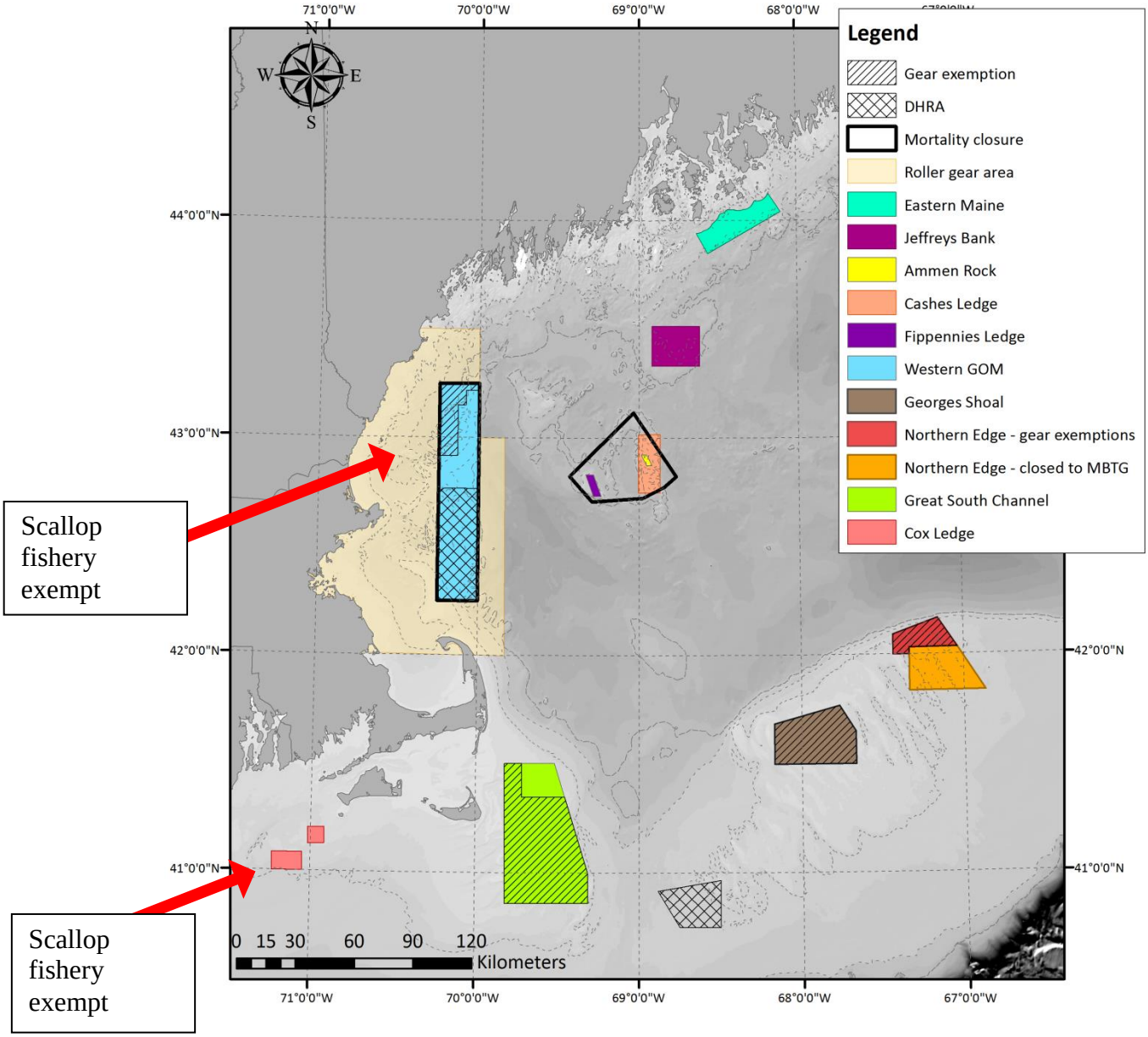
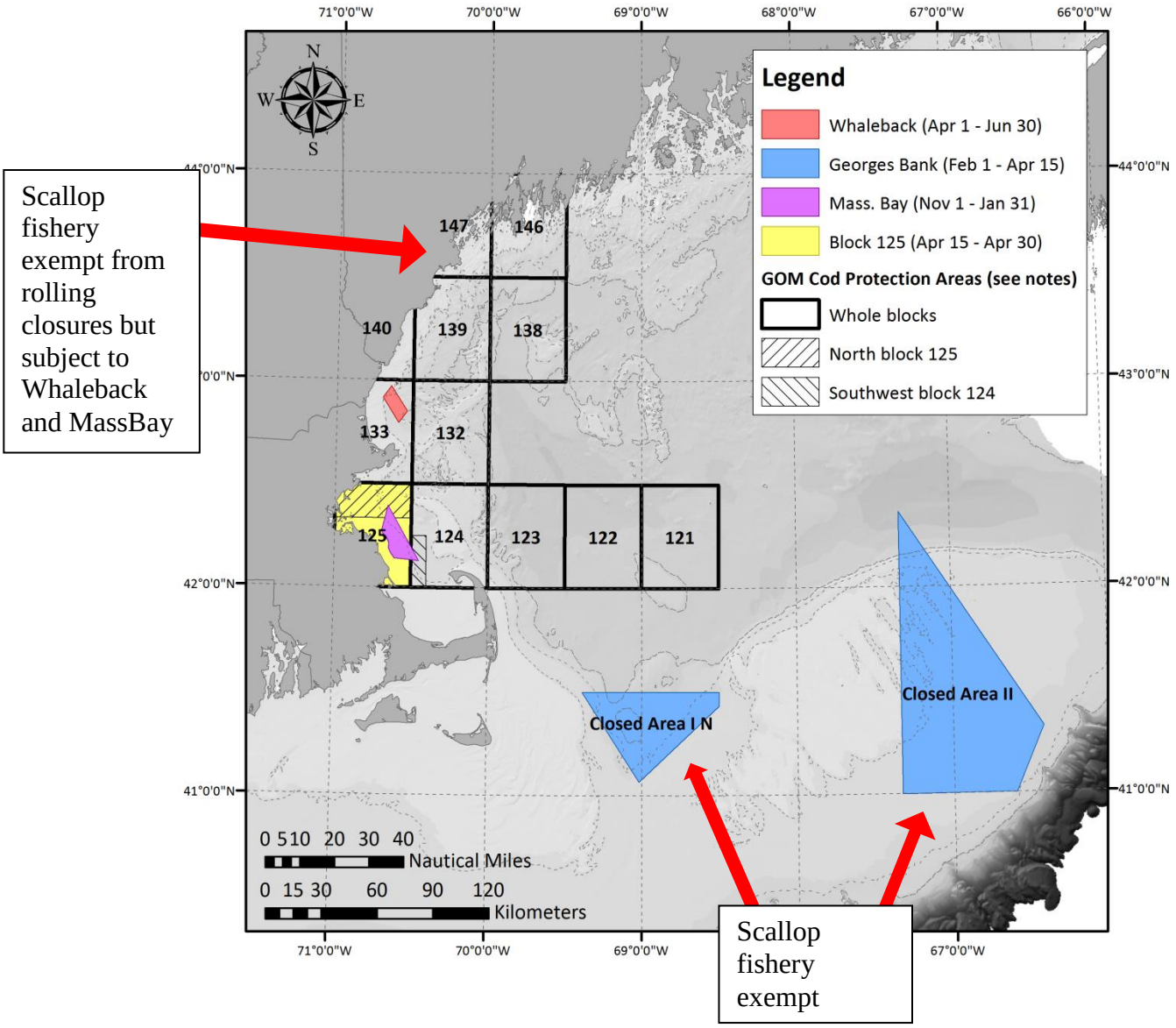


Figure 22 – Preferred alternative seasonal spatial management areas. Year-round areas not shown.

GOM COD PROTECTION CLOSURES	SPAWNING AREAS
Closed to commercial gears with various exemptions Nov-Jan: 125 and 124 (southwest corner of 124 only) Feb: None Mar: 121, 122, and 123 (all areas common pool only) April: None** May: 125 (northern part only), 132, 133, 138, 139, 140 June: 125 (northern part only), 132, 139, 140, 146, 147 July-September: None October: 124 and 125 (both areas common pool only)	-- Whaleback and Massachusetts Bay Cod Spawning Protection Areas have the same gear restrictions, i.e. closed to commercial and recreational gears with various exemptions -- Georges Bank areas closed to various commerical and recreational gears capable of catching groundfish, with various exemptions, including scallop dredges ** Block 125 in April is not part of Cod Protection Closures, but was added by Council in June as a spawning area from April 15 - April 30



4.3 PROTECTED RESOURCES

The following protected species are found in the environment in which the sea scallop fishery is prosecuted. A number of them are listed under the Endangered Species Act of 1973 (ESA) as endangered or threatened, while others are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA). An update and summary is provided in Table 22 to facilitate consideration of the species most likely to interact with the scallop fishery relative to the preferred alternative.

Table 22 – Protected species that may occur in the affected environment of the sea scallop fishery

Species	Status	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (*Eubalaena glacialis*)	Endangered	No
Humpback whale (*Megaptera novaeangliae*)	Endangered	No
Fin whale (*Balaenoptera physalus*)	Endangered	No
Sei whale (*Balaenoptera borealis*)	Endangered	No
Blue whale (*Balaenoptera musculus*)	Endangered	No
Sperm whale (*Physeter macrocephalus*	Endangered	No
Minke whale (*Balaenoptera acutorostrata*)	Protected	No
Pilot whale (*Globicephala spp.*)[1]	Protected	No
Risso's dolphin (*Grampus griseus*)	Protected	No
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected	No
Short Beaked Common dolphin (*Delphinus delphis*)[2]	Protected	No
Spotted dolphin (*Stenella frontalis*)	Protected	No
Striped dolphin (*Stenella coeruleoalba*)	Protected	No
Beaked whales (*Ziphius and Mesoplodon spp*)[3]	Protected	No
Bottlenose dolphin (*Tursiops truncatus*)[4]	Protected	No
Harbor porpoise (*Phocoena phocoena*)	Protected	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes

Green sea turtle (*Chelonia mydas*)	Endangered[5]	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	No
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme*)	Candidate	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected	No
Gray seal (*Halichoerus grypus*)	Protected	No
Harp seal (*Phoca groenlandicus*)	Protected	No
Hooded seal (Cystophora cristata)	Protected	No
Critical Habitat		
North Atlantic Right Whale[6]		No
Northwest Atlantic DPS of Loggerhead Sea Turtle		No

Notes:

[1] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

[2] Prior to 2008, this species was called "common dolphin."

[3] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon*; however, are difficult to identify at sea, and therefore, much of the available characterization for beaked whales is to the genus level only.

[4] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

[5] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters. On March 23, 2015, a proposed rule was issued to remove the current range-wide listing and, in its place, list eight DPSs as threatened and three as endangered (80 FR 15272).

[6] Originally designated June 3, 1994 (59 FR 28805); Newly proposed February 20, 2015 (80 FR 9314).

In Table 22, please note that cusk, a NMFS "species of concern," as well as a "candidate species" under the ESA, occurs in the affected environment of the multispecies fishery. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. Once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, this species will not be discussed further in this section. However, for additional information on cusk and proactive conservation efforts being initiated for the species, please visit http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/CuskSOC.html.

4.3.1 Species and Critical Habitat Not Likely to be Affected by the Alternatives Under Consideration

Based on available information, it has been determined that this action is not likely to affect any ESA listed or non-listed species of marine mammals (cetaceans or pinnipeds), shortnose sturgeon, or Atlantic salmon. Further, this action is not likely to adversely affect the Northwest Atlantic DPS of loggerhead or North Atlantic right whale critical habitats. This determination has been made because either the occurrence of the species is not known to overlap with the scallop fishery and/or there have never been documented interactions between the species and the scallop fishery. In the case of critical habitat, this determination has been made because the scallop fishery will not affect the primary constituent elements of the critical habitat, and therefore, will not result in the destruction or adverse modification of critical habitat. For additional details on the rationale behind these conclusions, please see Section 4.3.1 of Framework 26 to the Scallop FMP (http://s3.amazonaws.com/nefmc.org/Final-FW26_submission_150217.pdf).

Species Potentially Affected by the Alternatives Under Consideration

As noted in Table 22, ESA listed species of sea turtles and Atlantic sturgeon occur in the affected environment of the scallop fishery and have the potential to be affected by this fishery and the proposed Alternatives. To understand the potential risks these Alternatives pose to these listed species, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) records of protected species interaction with particular fishing gear types. In the sections below, information on sea turtle and Atlantic sturgeon occurrence in the affected environment of the scallop fishery, in addition to species interactions with scallop fishery gear, will be provided.

4.3.1.1 Sea Turtles

4.3.1.1.1 Occurrence and Distribution

During the development of Framework 26 to the Scallop fishery, the PDT used various sources of information to describe the occurrence and distribution of sea turtles in the affected environment of the scallop fishery. Below, the PDT provides a summary of the information provided in FW 26, with any updates since the issuance of the framework provided. For additional details on the sources of information used to develop this section, please refer to

section 4.3.2.1 of Framework 26. Further, additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant *et al*. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS *et al*. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

- **Hard-shelled sea turtles**

Distribution. In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill *et al*. 2008; Braun & Epperly 1996; Epperly *et al*. 1995; Mitchell *et al*. 2003; Shoop & Kenney 1992; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine, feeding as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7°C to 30°C, but water temperatures ≥11°C are most favorable (Epperly *et al*. 1995; Shoop & Kenney 1992). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Blumenthal *et al*. 2006; Braun-McNeill & Epperly 2004; Griffin *et al*. 2013; Hawkes *et al*. 2006; Hawkes *et al.* 2011; Mansfield *et al*. 2009; McClellan & Read 2007; Mitchell *et al*. 2003; Morreale & Standora 2005).

Seasonality. Hard-shelled sea turtles occur year-round in waters south of Cape Hatteras, North Carolina. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly *et al*. 1995; Epperly, Braun & Veishlow 1995; Griffin *et al*. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further (Epperly *et al.* 1995; Griffin *et al*. 2013; Hawkes *et al*. 2011; Shoop & Kenney 1992). Based on this information, as well as other sources of information reviewed and compiled during the development of Framework 26, hard-shelled sea turtles are most likely to be present in areas that overlap with the scallop fishery in the Mid-Atlantic between May and October and to a lesser extent, November (see Section 4.3.2.1 of Framework 26 for complete summary of information).

- **Leatherback sea turtles**

Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (Dodge *et al*. 2014; James *et al*. 2005; James *et al*. 2006; NMFS & USFWS 1992). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (Dodge *et al*. 2014; Eckert *et al*. 2006; James *et al*. 2005; Murphy *et al*. 2006).

Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (Dodge *et al.* 2014; James *et al*. 2005; James *et al*. 2006).

4.3.1.1.2 Gear Interactions

As described in section 1.1.2.1.1, sea turtles are widely distributed in the waters of the Northwest Atlantic, although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992; Epperly *et al.* 1995a, 1995b; Braun and Epperly 1996; Mitchell *et al.* 2003; Braun-McNeill *et al.* 2008; TEWG 2009; Braun-McNeill and Epperly 2004; Morreale and Standora 2005; Griffin *et al.* 2013; NMFS and USFWS 1992; James *et al.* 2005, 2006; Dodge *et al.* 2014). As a result, sea turtles often occupy many of the same ocean areas utilized for commercial fishing and therefore, interactions with fishing gear is possible. In the sea scallop fishery, dredge and trawl gear are used to target scallops and are known to pose a risk to sea turtles (Henwood and Stuntz 1987; Lutcavage and Lutz 1997; Epperly *et al*. 2002; Sasso and Epperly 2006; Haas *et al*. 2008; Murray 2011; Warden 2011a,b; NMFS 2012b).

Although sea turtle interactions with scallop trawl and dredge gear have been observed in the Gulf of Maine, Georges Bank, and the Mid-Atlantic, most of the observed interactions have occurred in the Mid-Atlantic.[1] There is insufficient data available to conduct a robust model-based analysis to estimate sea turtle interactions with scallop trawl or dredge gear outside the Mid-Atlantic. As a result, the bycatch estimates and most of the discussion below are based on observed sea turtle interactions in scallop trawl and dredge gear in the Mid-Atlantic.

- **Sea Scallop Dredge Gear**

Kemp's ridley, green, loggerhead, and unknown sea turtle species have been documented interacting with sea scallop dredge gear; loggerhead sea turtles are the most commonly taken species.[2] Two regulations have been implemented to reduce serious injury and mortalities to sea turtles resulting from interactions with sea scallop dredges:

- (1) **Chain mat modified dredge** (71 FR 50361, August 25, 2006; 71 FR 66466, November 15, 2006; 73 FR18984, April 8, 2008; 74 FR 20667, May 5, 2009; 76 FR 22119, April 21, 2015): Requires federally permitted scallop vessels fishing with dredge gear to modify their gear by adding an arrangement of horizontal and vertical chains (referred to as a "chain mat"). The purpose of the chain mat is to prevent captures in the dredge bag and injury and mortality that results from such capture. It should be noted; however, that although the chain may is expected to reduce the impact of sea turtle takes in dredge gear, it does not eliminate the take of sea turtles; and

[1] To date, there has been one loggerhead observed in trawl gear (top landed species was sea scallop), and two Kemp's ridleys observed in dredge gear; these observed interactions occurred on Georges Bank.

[2] One unconfirmed take of a leatherback sea turtle was reported during the experimental fishery to test the chain-mat modified gear (DuPaul *et al.*2004).

- (2) **Turtle Deflector Dredge** (77 FR 20728, April 6, 2012; 76 FR 22119, April 21, 2015)**:** All limited access scallop vessels, as well as Limited Access General Category vessels with a dredge width of 10.5 feet or greater, must use a Turtle Deflector Dredge (TDD) to deflect sea turtles over the dredge frame and bag rather than under the cutting bar, so as to reduce sea turtle injuries due to contact with the dredge frame on the ocean bottom (including being crushed under the dredge frame). As of May 2015, both gear modifications are now required in waters west of 71°W from May 1 through November 30 each year (76 FR 22119, April 21, 2015).

Based on Northeast Fisheries Observer Program data, Murray (2011) assessed loggerhead and hard-shell turtle interactions in the Mid-Atlantic sea scallop fishery from 2001-2008 (Figure 1). After the implementation of the chain-mat requirements, Murray (2011) estimated an average of 125 (observable and unobservable but quantifiable) hard-shelled sea turtles (95% CI: 88-163; 22 adult equivalents[3]) interacted with scallop dredge gear annually (Table 2). Most recently, Murray (2015a) estimated loggerhead interactions in the Mid-Atlantic scallop dredge fishery from 2009-2014. The average annual estimate of observable turtle interactions in scallop dredge gear was 11 loggerhead sea turtles per year (95% CI: 3-22; Murray 2015a). When the observable interaction rate from dredges without chain mats, was applied to trips that used chain mats and TDDs, the estimated number of loggerhead interactions (observable and unobservable but quantifiable) was 22 loggerheads per year (95% CI: 4-67; Murray 2015a). These 22 loggerheads equate to 2 adult equivalents per year, and 1-2 adult equivalent mortalities (Murray 2015a).

Table 23 - Average annual estimated interactions of hard-shelled (unidentified and loggerhead species pooled) and loggerhead turtles in the Mid-Atlantic scallop dredge fishery before and after chain mats were required on dredges (CV and 95% Confidence Interval).
AE = adult equivalent estimated interactions. **A**= estimated interactions from dredges without chain mats; B = estimated observed interactions from dredges with or without chain mats; **C** = estimated observed and unobserved, quantifiable interactions from dredges without chain mats, to estimate the mat's maximum conservation value (*Source*: Murray 2011).

	Interactions		**Interactions**	
Time Period	Hard-shelled	AE	Loggerhead	AE
(A) 2001-25 Sept 2006	288 (0.14, 209-363)	49	218 (0.16, 149-282)	37
(B) 26 Sept 2006-2008	20 (0.48, 3-42)	3	19 (0.52, 2-41)	3
(C) 26 Sept 2006-2008	125 (0.15, 88-163)	22	95 (0.18, 63-130)	16

- **Sea Scallop Trawl Gear**

Warden (2011a) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic (i.e., south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border) was 292 (CV=0.13, 95% CI=221-369), with an

[3] Adult equivalence considers the reproductive value of the animal (Warden 2011; Murray 2013), providing a "common currency" of expected reproductive output from the affected animals (Wallace *et al*. 2008), and is an important metric for understanding population level impacts (Haas 2010).

additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but being released through a Turtle Excluder Device.4 Of the 292 average annual observable loggerhead interactions, approximately 44 of those were adult equivalents (Warden 2011a). Most recently, Murray (2015b) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic (i.e., defined by the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71oW to the North Carolina/South Carolina border) was 231 (CV=0.13, 95% CI=182-298). Of the 231 total average annual loggerhead interactions, approximately 33 of those were adult equivalents (Murray 2015b).These latter estimates are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated to be 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). Based on data collected by observers for reported sea turtle captures in bottom otter trawl gear from 2005-2008, Warden (2011b), using species landed, also estimated total loggerhead interactions attributable to managed species. The estimated average annual bycatch of loggerhead sea turtles in bottom otter trawl gear for trips primarily landing scallops during 2005-2008 was 95 loggerheads (95% CI =60-140; Warden 2011b). Murray (2015b) provided similar estimates of loggerhead interactions by managed fished species from 2009-2013. Specifically, an estimated average annual take of six loggerheads (95% CI=0-23) were attributed to the scallop fishery.

Gear Interaction Factors

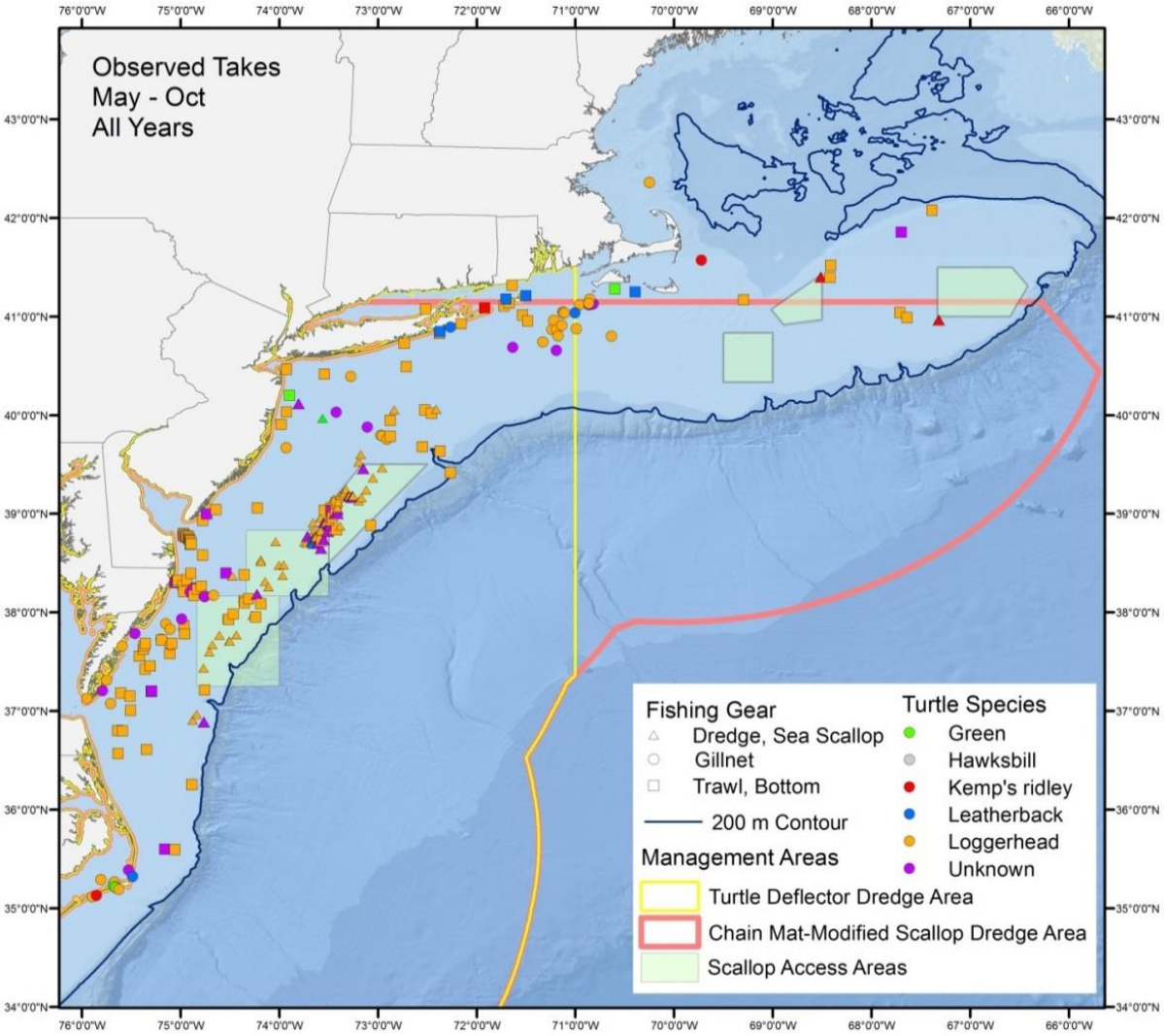
Although sea turtles have the potential to interact with multiple gear types, such as dredge or trawl gear, the risk of an interaction is affected by multiple factors, including where and when fishing effort is focused, the type of gear being used, environmental conditions, and sea turtle occurrence and distribution. Based on studies done by Murray and Orphanides (2013), Murray (2013), and Warden (2011a), it was concluded that both fishery dependent and independent encounter rates were a function of latitude, sea surface temperature (SST), depth, and salinity. Specifically, these studies found a decreasing trend in encounter rates as latitude increases; an increasing trend as SST increases; a bimodal relationship between encounter rates and salinity; and higher encounter rates in depths < 50 m.

Summary of Observed Locations of Turtle Interactions with Scallop Dredge, Bottom Trawl, and Gillnet Gear

Figure 2 provides a depiction of the overall observed locations of sea turtle interactions with gillnet (drift and sink), bottom trawl (fish, scallop, and twin), and sea scallop dredge (bottom tending) gear in the Northeast Region from 1989-2013 during the months of May-October. Moderately and severely decomposed animals are not included in Figure 2. For additional maps depicting turtle interactions in bottom tending gears during November or December –April, a period of low to no sea turtle occurrence in the Northeast Region, please see Section 4.3 of Framework 26 of the Scallop FMP.

[4] Warden (2011) and Murray (2013) define the mid-Atlantic slightly differently, but both include waters north to Massachusetts. See the respective papers for a more complete description of these areas.

Figure 23 – Observed location of turtle interactions in bottom tending gears in the Northeast Region in the months of May – October (1989-2013)



4.3.1.2 Atlantic Sturgeon

4.3.1.2.1 Atlantic Sturgeon Distribution

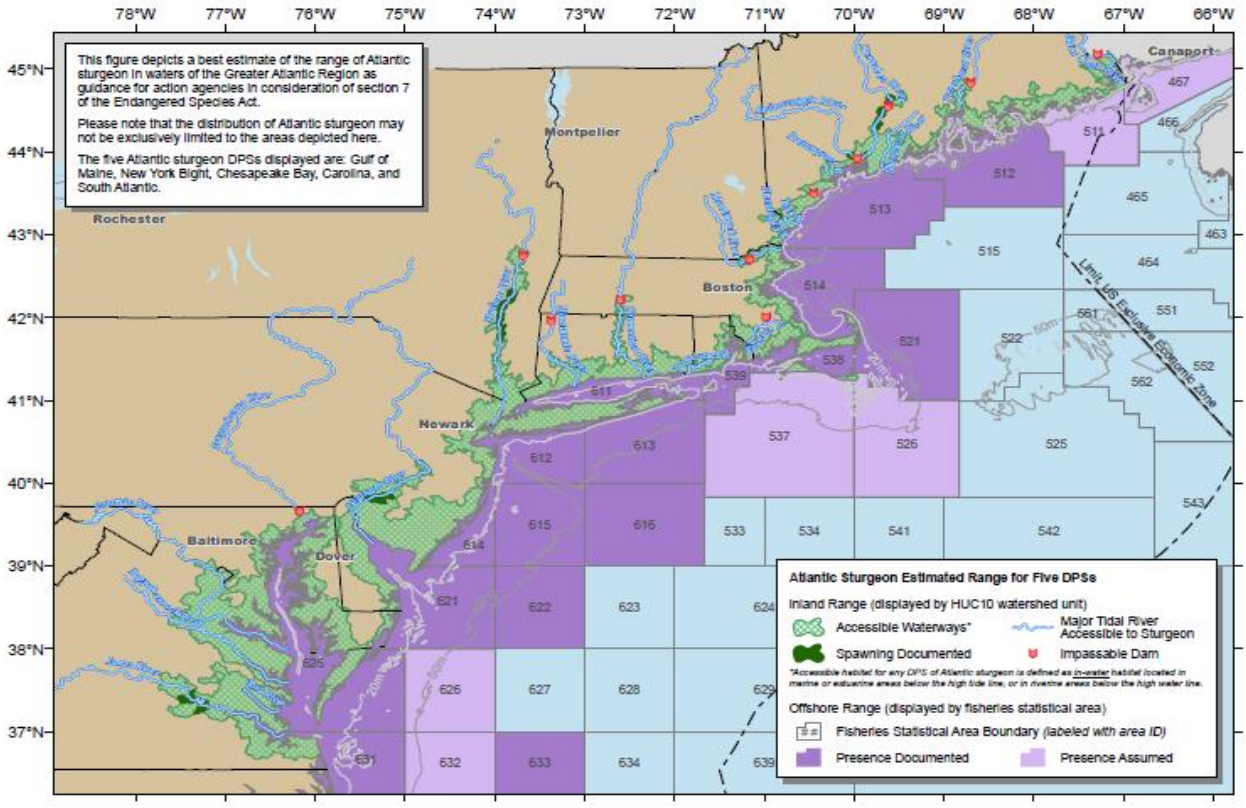
During the development of Framework 26 to the Scallop fishery, the PDT used various sources of information to describe the occurrence and distribution of Atlantic sturgeon DPSs in the affected environment of the scallop fishery. Below, the PDT provides a summary of the information provided in FW 26, with any updates (i.e., literature) since the issuance of the framework provided. For additional details on the information below please refer to section X of Framework 26. Further, additional information on the biology, status, and range wide

distribution of each distinct population segment of Atlantic sturgeon please refer to 77 FR 5880 and 77 FR 5914 (finalized February 6, 2012), as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007).

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (See; ASSRT 2007; Dovel and Berggren 1983; Dadswell *et al*. 1984; Kynard *et al*. 2000; Stein *et al*. 2004a; Dadswell 2006; Laney *et al*. 2007; Dunton *et al*. 2010; Erickson *et al*. 2011; Wirgin *et al*. 2012; Waldman *et al.* 2013; O'Leary *et al*. 2014; Wirgin *et al*. 2015). In fact, several genetic studies, have been conducted to address DPS distribution and composition in marine waters (Wirgin *et al*. 2012; Damon-Randall *et al*. 2013; Waldman *et al*. 2013; O'Leary *et al.* 2014; Wirgin *et al*. 2015). Using samples from Atlantic sturgeon captured from various marine aggregation sites along the Northeast coast, results from these studies showed that these aggregations, regardless of location, were comprised of all 5 DPSs of Atlantic sturgeon; however, each DPS comprised various percentages of the aggregation depending on the area along the coast the aggregation was found and sampled (Wirgin *et al*. 2012; Damon-Randall *et al*. 2013; Waldman *et al*. 2013; O'Leary *et al*. 2014).[5]

[5] Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard. For specific information on these various aggregation areas please see: Stein *et al*. 2004a; Laney *et al*. 2007; Dunton *et al*. 2010; Erickson *et al*. 2011; Oliver *et al*. 2013; Bath *et al*. 2000; Savoy and Pacileo2003; and Waldman *et al*. 2013.

Figure 24 – Estimated range of Atlantic Sturgeon Distinct Population Segments (DPSs)



Source: http://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/atlanticsturgeon.pdf.pdf

Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b; Erickson *et al*. 2011; Dunton *et al*. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein *et al*. 2004a,b; Dunton *et al*. 2010; Erickson *et al*. 2011)). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon undertake seasonal movements along the coast (Dunton *et al*. 2010; Erickson *et al*. 2011). In general, analysis of fishery-independent survey data indicates a coastwide distribution of Atlantic sturgeon from the spring through the fall, with Atlantic sturgeon being more centrally located (e.g., Long Island to Delaware) during the summer months; and a more southerly (e.g., North Carolina, Virginia) distribution during the winter (Dunton *et al*. 2010; Erickson *et al*. 2011). Although studies such as Erickson *et al*. (2011) and Dunton *et al*. (2010) provide some indication that Atlantic sturgeon are undertaking seasonal movements horizontally and vertically along the U.S. eastern coastline, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

4.3.1.2.2 Gear Interactions

Atlantic sturgeon captures in Northeast fisheries have been documented and recorded by the NEFOP. Review of available observer data indicates that no Atlantic sturgeon have been reported as caught in scallop dredge or trawl gear where the haul target or trip target is scallop. However, according to the NMFS Opinion on the sea scallop fishery issued on July 12, 2012, given the known capture of Atlantic sturgeon in trawl fisheries operating in the affected area of the scallop fishery (Stein *et al*. 2004b; ASMFC 2007; Miller and Shepard 2011), it is reasonable to anticipate that some small level of bycatch may occur in the scallop trawl fishery; however, the incidence rate is likely to be very low. The 2012 Opinion also concluded that, given the way that scallop dredges operate, the lack of documented interactions is likely reflective of a true lack of captures of Atlantic sturgeon in scallop dredge gear.

4.4 ECONOMIC AND SOCIAL ENVIRONMENT

4.4.1 Introduction

This section of the document describes the economic and social trends of the scallop fishery, including trends in landings, revenues, prices and foreign trade for the sea scallop fishery since 1994. In addition, it provides background information about the scallop fishery in various ports and coastal communities in the Northeast.

4.4.2 Trends in landings, prices and revenues

During the period from 2002 fishing year to 2012 fishing year, the scallop landings averaged about 57.4 million pounds peaking over 64.8 million lb. in 2004 fishing year. The recovery of the scallop resource and consequent increase in landings and revenues was striking given that average scallop landings per year were below 16 million pounds during the 1994-1998 fishing years. However, the landings from the Northeast sea scallop fishery fell to 40.4 million pounds in 2013 fishing year and to 32.5 million pounds in the 2014 fishing year for the first time since 2001 (Figure 25 and Table 41).

The increase in the abundance of scallops coupled with higher scallop prices increased the profitability of fishing for scallops by the general category vessels especially after 2002 fishing year. As a result, general category landings increased from less than 0.4 million pounds during the 1994-1998 fishing years to more than 4 million pounds during the fishing years 2005-2009, peaking at 7 million pounds in 2005 or 13.5% of the total scallop landings (Table 42). The landings by the general category vessels declined after 2009 as a result of the Amendment 11 implementation that restricts TAC for the limited access general category fishery to 5.5% of the total ACL. The landings by limited access general category fishery including by IFQ, NGOM and incidental permits, declined to about 2.5 million lb. in 2013 and 2014 fishing years (Figure 25).

Figure 25 - Scallop landings by permit category and fishing year (in lb., dealer data)

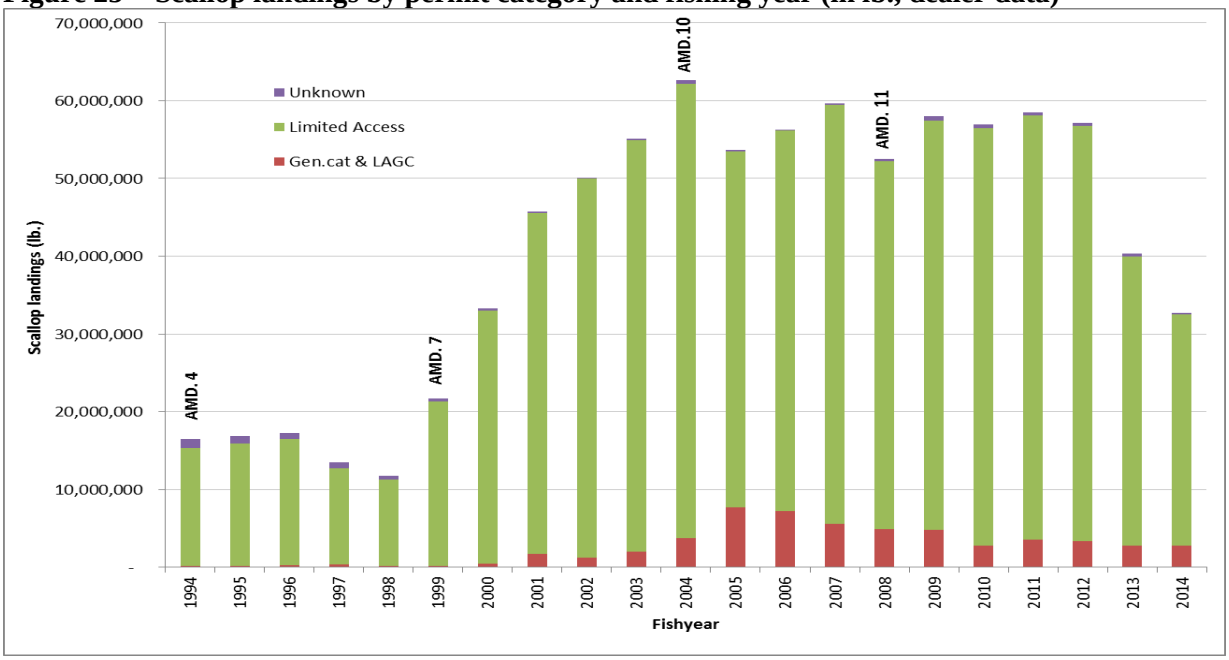
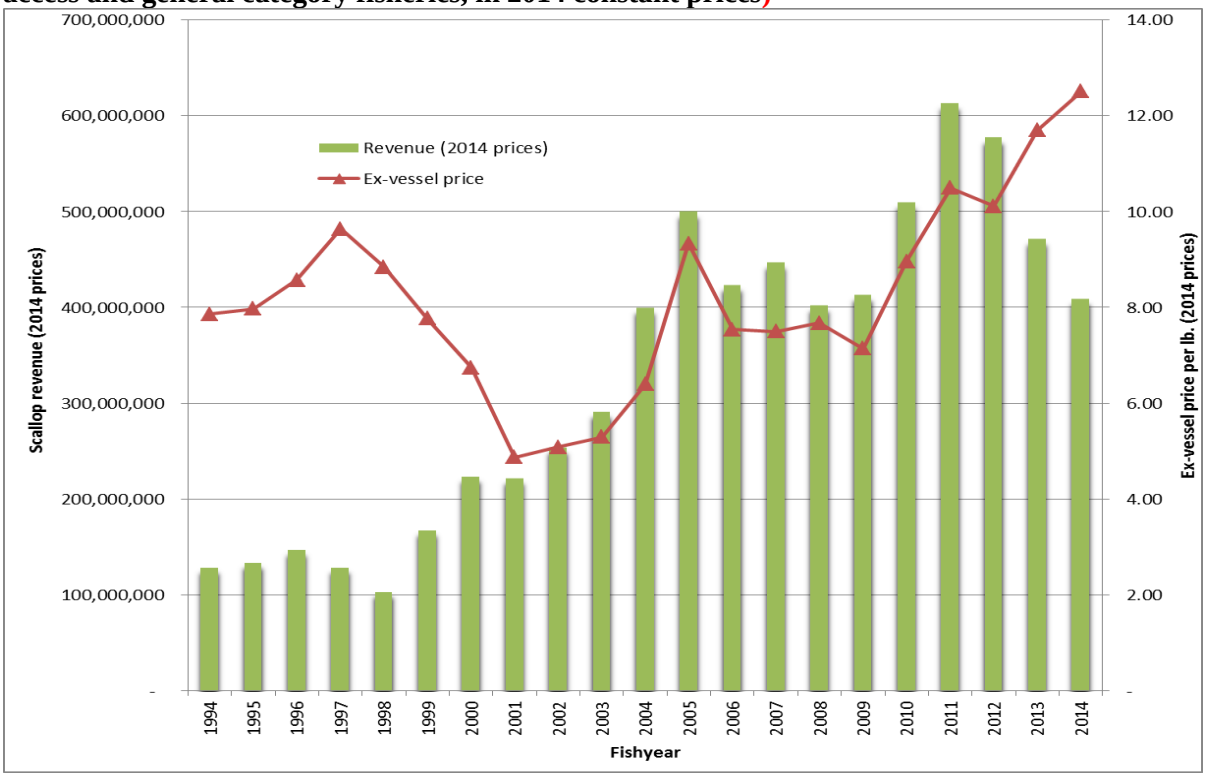


Figure 26 shows that total fleet revenue more than quadrupled in 2011 ($601 million, in inflation adjusted 2011 dollars) fishing year from its level in 1994 ($127 million, in inflation adjusted 2011 dollars). Scallop ex-vessel prices increased after 2001 as the composition of landings changed to larger scallops that in general command a higher price than smaller scallops. However, the rise in prices was not the only factor that led to the increase in revenue in the recent years compared to 1994-1998. In fact, inflation adjusted ex-vessel prices in 2008-2009 were lower than prices in 1994 (Figure 26). The increase in total fleet revenue was mainly due to the increase in scallop landings and the increase in the number of active scallop vessels during the same period.

The ex-vessel prices increased significantly to over $10 per pound of scallops in 2011 fishing year as the decline in the value of the dollar led to an increase in exports of large scallops to the European countries resulting in record revenues from scallops reaching to $601 million for the first time in scallop fishing industry history (Figure 26). The scallop ex-vessel prices peaked to $11.7 per lb. in 2013 due to the decline in landings by almost 30% in the same year. As a result, scallop revenue declined by a smaller percentage (18%) relative to the decline in decline in landings, from about $568 million in 2012 to $466 million (in 2014 prices) in 2013, a level which still could be considered high by historical standards (Figure 26). Similarly in 2014, scallop landings declined to about 32.5 million pounds (or by 20% from the levels in 2013) and scallop revenue declined to $403 million, at a smaller rate (or by 14%), due to the increase in average annual price to $12.5 (Figure 26).

Figure 26 - Trends in total scallop revenue and ex-vessel price by fishing year (including limited access and general category fisheries, in 2014 constant prices)



The trends in landings and revenue per full-time vessel were similar to the trends for the fleet as a whole. Figure 27 shows that average scallop revenue per full-time dredge vessel reached $1,800,000 in 2011 as a result of higher landings combined with an increase in ex-vessel prices. For full-time small dredge vessels, average revenue per vessel increased to over $1,400,000 in 2011 (Figure 28). However, average scallop revenue per full-time dredge vessel declined in 2014 to $1,238,220 for full-time and to $741,782 per the full-time small dredge vessel due to the decline in landings in this fishing year (Figure 27 and Figure 28).

Figure 27 - Trends in average scallop landings per full time vessel by category (Dealer data)

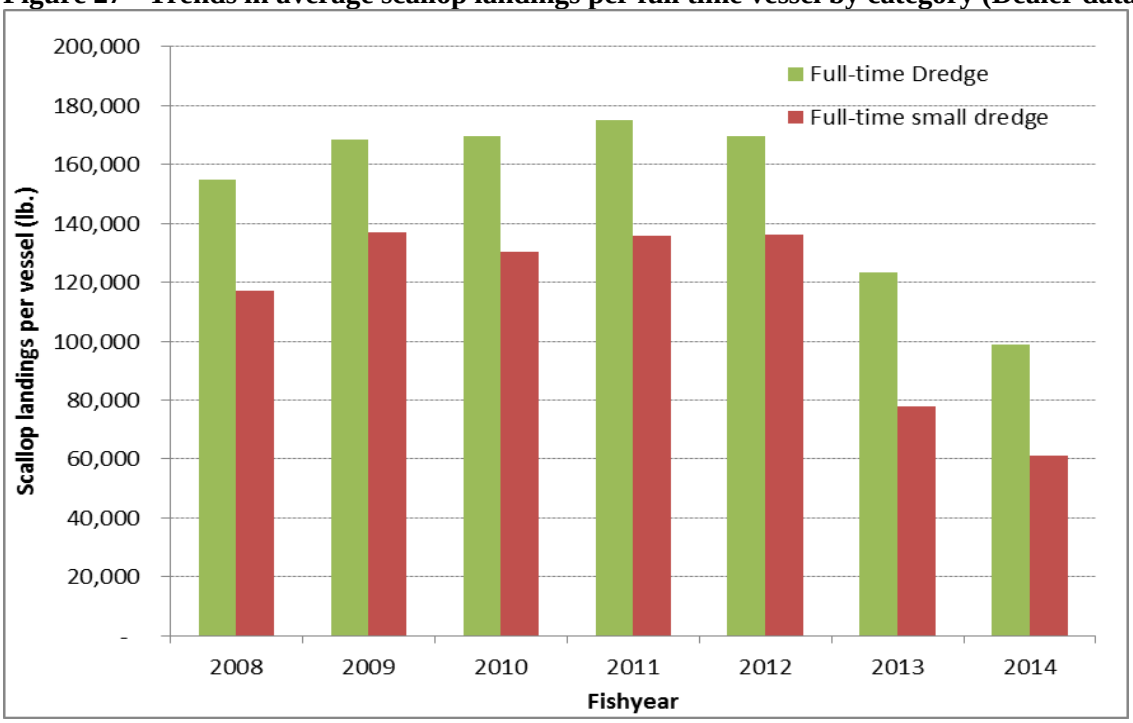
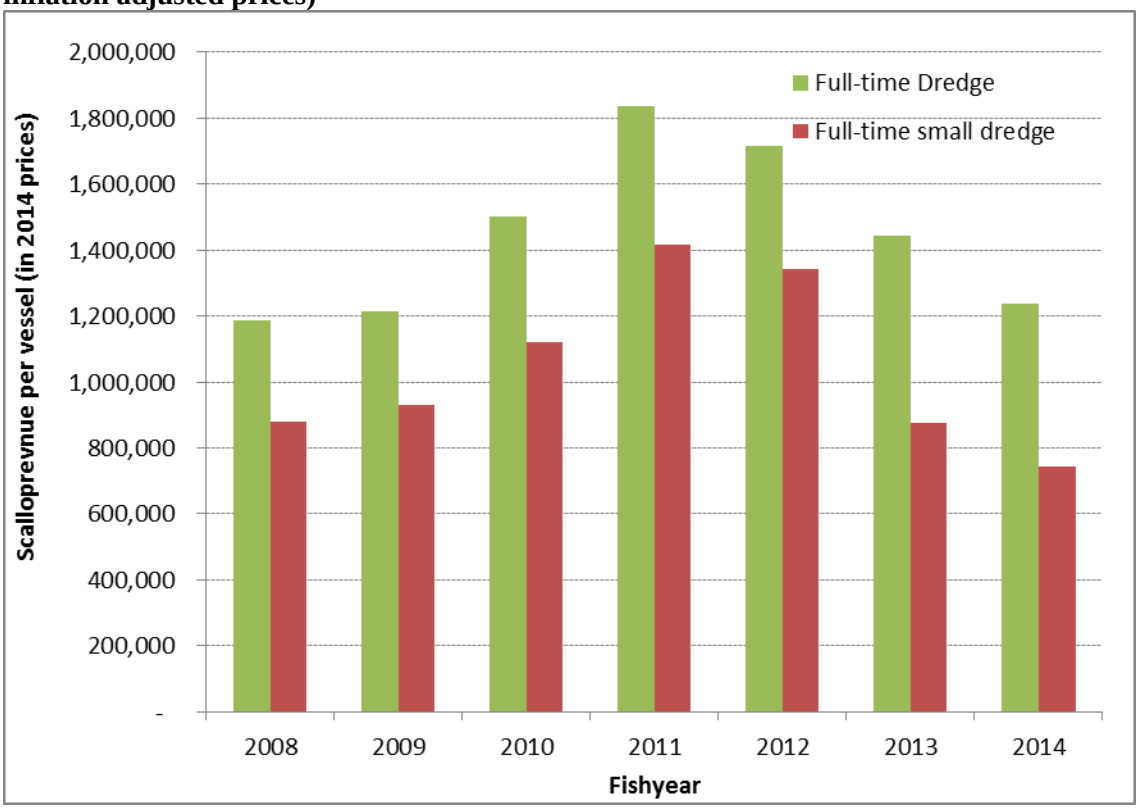


Figure 28 - Trends in average scallop revenue per full-time vessel by category (Dealer data, in 2014 inflation adjusted prices)



Although general category landings declined after 2009, scallop landings and revenue per active limited access general category vessel exceeded the levels in 2009 as the quota is consolidated on or fished by using fewer vessels (Figure 29 and Figure 30). It should be noted that these are estimated numbers from dealer data based on some assumptions in separating the LAGC landings from LA landings. It was assumed that if an LA vessel also had an LAGC permit, those trip landings which are less than 600 lb. in 2011 and less than 400 lb. in 2010 and 2009 were LAGC landings and any among above these were LA landings.

Figure 29 - Trends in average scallop landings per vessel for the LAGC fishery by permit category

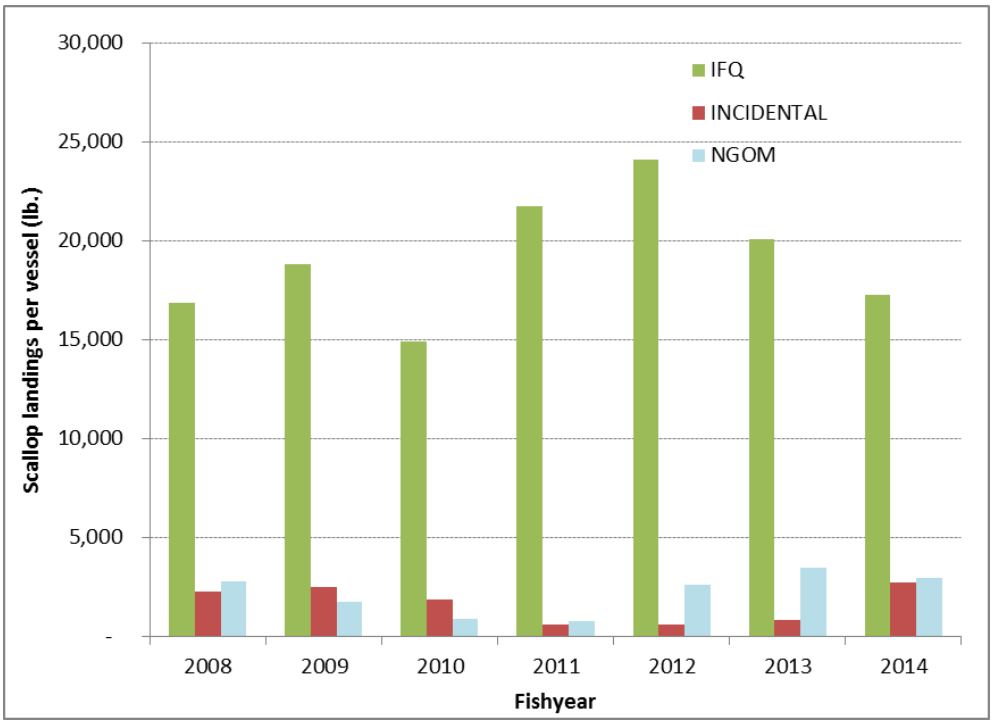
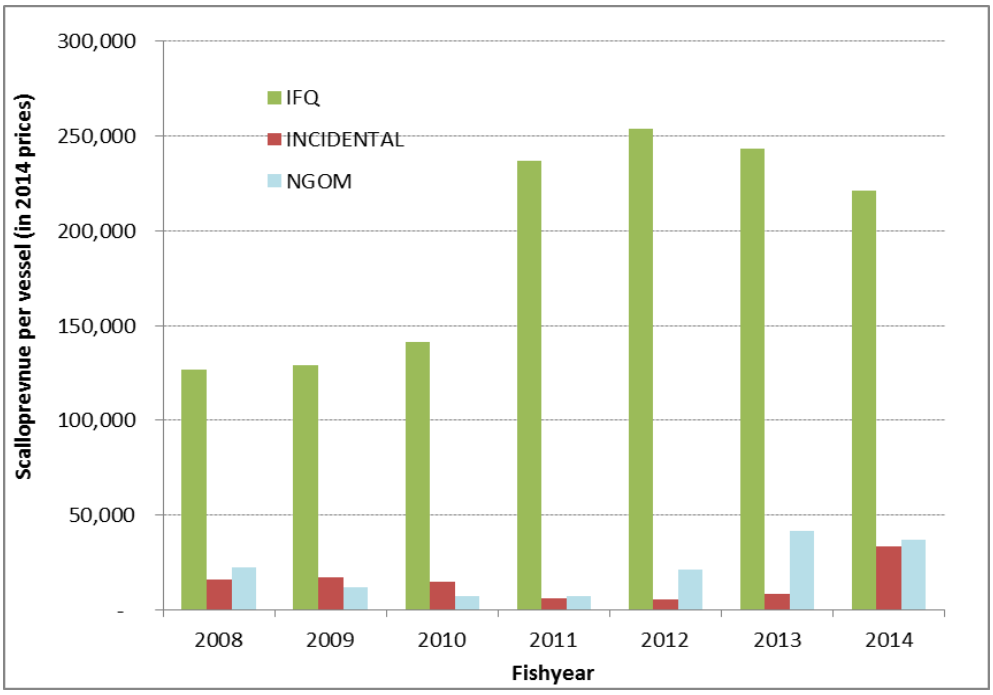


Figure 30 - Trends in average scallop revenue per vessel for the LAGC fishery (dealer data, in 2014 inflation adjusted prices)



4.4.3 Trends in allocations, effort and LPUE

Prior to the 1999 fishing year, the scallop fishery was managed by overall DAS allocations in the open areas. There has been a steady decline in the total open area DAS allocations from 1994 to 1998 fishing years as a result of the effort-reduction measures of Amendment 4 (Table 24). DAS allocations during this period were reduced by about 30% from 204 DAS in 1994 to 142 DAS in 1998 fishing year. Open area DAS was further reduced to 120 DAS by Amendment 7 and in frameworks 11 to 15 during the period from the 1999 fishing year to 2003 fishing year (Table 25). As a result, estimated DAS-used (VTR data) reached the lowest levels of about 24,000 days in the 1999 from over 30,000 days in 1995-1996 (Figure 31).

Table 24 – DAS allocations per full-time vessel

Implementation Year	Allocations based on the Management Action	Total DAS Allocation
1994	Amendment 4	204
1995	Amendment 4	182
1996	Amendment 4	182
1997	Amendment 4	164
1998	Amendment 4	142

Table 25 - DAS and access area allocations per full-time vessel

Year	Action	DAS	AA trips	CA1	CAII	NLS	VB	HC	ETA	DMV	Poss. Limit
1999	FW11	120	3	Closed	3 trips	Closed	Closed	Closed	N/A	N/A	10000
2000	FW12	120	6	2 trips	3 trips	1 trip	Closed	Closed	N/A	N/A	10000
2001	FW14	120	3	Closed	Closed	Closed	3 trips		N/A	N/A	17000
2002	FW14	120	3	Closed	Closed	Closed	3 trips		N/A	N/A	18000
2003	FW15	120	3	Closed	Closed	Closed	3 trips		N/A	N/A	21000
2004	FW16, A10	42	7	Closed	2 trips	1 trip	converted to open area	4 trips	Closed	N/A	18000
2005	FW16	40	5	1 trip	1 trip	Closed		3 trips	Closed	N/A	18000
2006	FW18	52	5 + HC carryover[6]	Closed	3 trips	2 trips		open for 2005 carryover trips	Closed	N/A	18000
2007	FW18/FW20	51	5 + HC carryover	1 trip	Closed	1 trip		open for 2005 carryover trips	3 trips	Closed (Jan 1, 2007)	18000
2008	FW19	35	5	Closed	Closed	1 trip		Closed	4 trips	Closed	18000
2009	FW19	42	5	Closed	1 trip	Closed		Closed	3 trips	1 trip	18000
2010	FW21	38	4	Closed	Closed	1 trip		Closed	2 trips	1 trip	18000
2011	FW22 and EA	32	4	1.5 trips	0.5 trips	Closed by emergency		1 trip	converted to open area	1 trip	18000
2012	FW22 and EA	34	4	1 trip[7]	1 trip	0.5 trips		1.5 trips	Closed (Dec 12, 2012, by EA)	Closed by EA (trips converted to CA1)	18000
2013	FW24	33	2	118 trips[8]	182 trips	116 trips		210 trips	Closed	Closed	13000
2014	FW25	31	2	Closed	197 trips	116 trips		Closed	Closed	313 trips[9]	12000
2015	FW26	30.86	3[10]	Closed	Closed	Closed		Merged into one MAAA, but inshore part of ETA closed			17000

[6] *FW18 also allowed vessels to exchange 2006 CA2 and NL trips for ETA 2007 trips.*
[7] *1 trip after emergency action May 2012 (157 vessels get initial trip per FW22 and 156 get CA1 trip converted from initial DMV trip).*
[8] *FW25 then allows unused trips to be carried over to future year.*
[9] *Vessels given choice of Delmarva trip or 5 DAS.*
[10] *Vessels were not allocated trips in access areas, instead a poundage was allocated with a possession limit.*

Until the implementation of Amendment 10, each access area trip were assigned a 10 DAS trade-off such that any vessel that choose not to fish in access areas could instead fish for scallops in the open areas for 10 DAS. Thus, before 2004, total DAS allocation for the access areas is calculated as the number of trips multiplied by 10 DAS (even though it might have taken less than 10 DAS to land the possession limit in those areas). Following this method, Table 24 and Table 25 show that total DAS allocations for open and access areas per full-time vessel declined from 204 DAS in 1994 to 120 DAS in 2003.

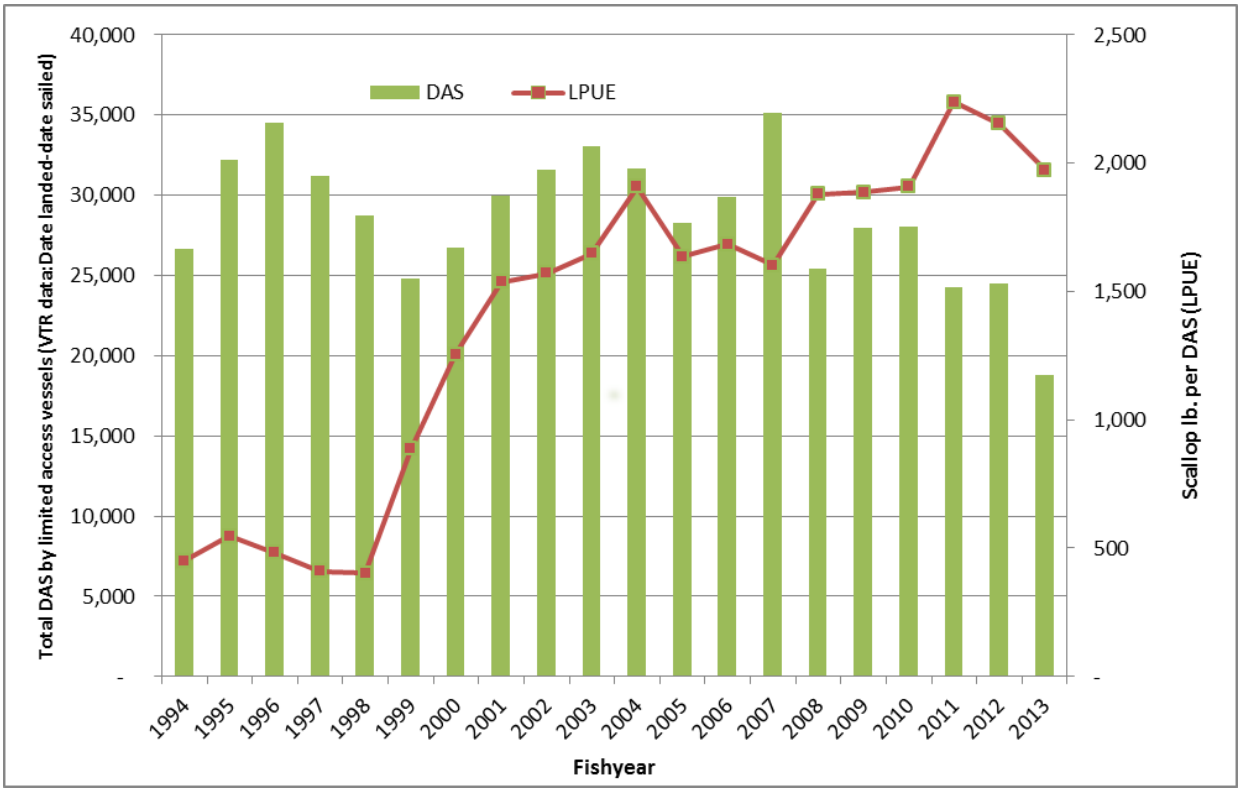
After fishing year 1999, fishing effort started to increase as more limited access vessels participated in the sea scallop fishery. The increase in total effort was mostly due to the increase in the number of vessels because total DAS allocations (mostly less than 120 days) were lower than the DAS allocations in the mid-1990s (over 142 days, Table 25).

The recovery of the scallop resource and the dramatic increase in fishable abundance after 1999 increased the profits in the scallop fishery, thus leading to an increase in participation by limited access vessels that had been inactive during the previous years. Georges Bank closed areas were opened to scallop fishing starting in 1999 by Framework 11 (CAII) and later by Framework 13 (CAII, CAI, NLS), encouraging many vessel owners to take the opportunity to fish in those lucrative areas. Frameworks 14 and 15 provided controlled access to Hudson Canyon and VA/NC areas. As a result, the number of active limited access permits in the sea scallop fishery increased from 258 in 2000 to 303 in 2003. The total fishing effort by the fleet increased to about 33,000 days in 2003 from about 26,700 days in 2000 (Figure 31). Total fishing effort (DAS used) declined after 2003 even though the number of active limited access permits increased to over 330 since 2006, and to over 340 permits since 2009 (Table 37).

With the implementation of Amendment 10 (2004) the limited access vessels were allocated DAS for open areas and area specific access area trips with no open area trade-offs. Although the vessels could no longer use their access area allocations in the open areas, Amendment 10 and Frameworks 16 to 18 continued to include an automatic DAS charge of 12 DAS for each access area trip until it was eliminated by NMFS.

Total DAS-used declined further in 2008 to about 25,400 days as the open area DAS allocations are reduced by 30% from 51 days to 35 days per full-time vessel, but increased to 26,300 in 2009 as the limited access vessels received access area trips (5 trips per vessel) and 42 open area days. Total DAS-used by the limited access vessels were higher in 2010 despite lower number of access area trips (4 trips per vessel). Open area DAS allocations were slightly higher in 2010 (38 DAS versus 37 DAS in 2009) and vessels spend more time fishing in the access areas. Total DAS-used further declined since 2011 due to the decrease in open area DAS allocations. As a result of reduction in the number of access area trips to two trips per full-time vessel in 2013 fishing year, the total DAS-used reached its lowest level in this year with a total of 18,809 days as defined by the difference in the date landed and date sailed form the VTR records.

Figure 31 - Total DAS-used (Date landed – Date sailed from VTR data) by all limited access vessels and LPUE



The impact of the decline in effort below 30,000 days since 2005 (with the exception of 2007) on scallop revenue per vessel was small, however, due to the increase in LPUE from about 1600 pounds per day-at-sea in 2007 to over 2237 pounds per day-at-sea in 2011 and to about 1900 lb. per day-at-sea in all areas (As estimated from date landed – date sailed from VTR data, Figure 31). Figure 32 shows that LPUE for the full-time dredge vessels was higher (about 2200 lb. in 2013 fishing year) than the LPUE of small dredge vessels (about 1416 lb. in 2013 fishing year).

It must be cautioned that these LPUE numbers are lower than the estimates used in the PDT analyses used to estimate open area DAS allocations. The numbers in Figure 31 through Figure 32 are obtained from the VTR database and include the steam time as calculated the days spent at sea starting with the sail date and ending with the landing date. In addition, those numbers include both open and access areas. In contrast, total "DAS used" in the fishery is the value incorporated in the LPUE models by the PDT to calculate future DAS allocations in the open areas for the full-time vessels. In these models, the value for DAS used comes from the field "DAS charged" from the DAS database. DAS charged is based on the time a vessel crossed the VMS demarcation line going out on a trip, and the time it crossed again coming back from a trip, so it wouldn't include the time from (to) the port to (from) the demarcation line at the start (end) of the trip. Therefore, the DAS-used (LPUE) calculated from the VTR data would be greater (lower) than the DAS-used (LPUE) calculated from the demarcation line in the DAS database. Because VTR data is available for a longer period, however, it is useful in analyzing the historical trends in LPUE (from port to port) since 1994.

Figure 32 - LPUE for full-time vessels by permit category (VTR data, includes steam time and LA vessels with IFQ permits as well)

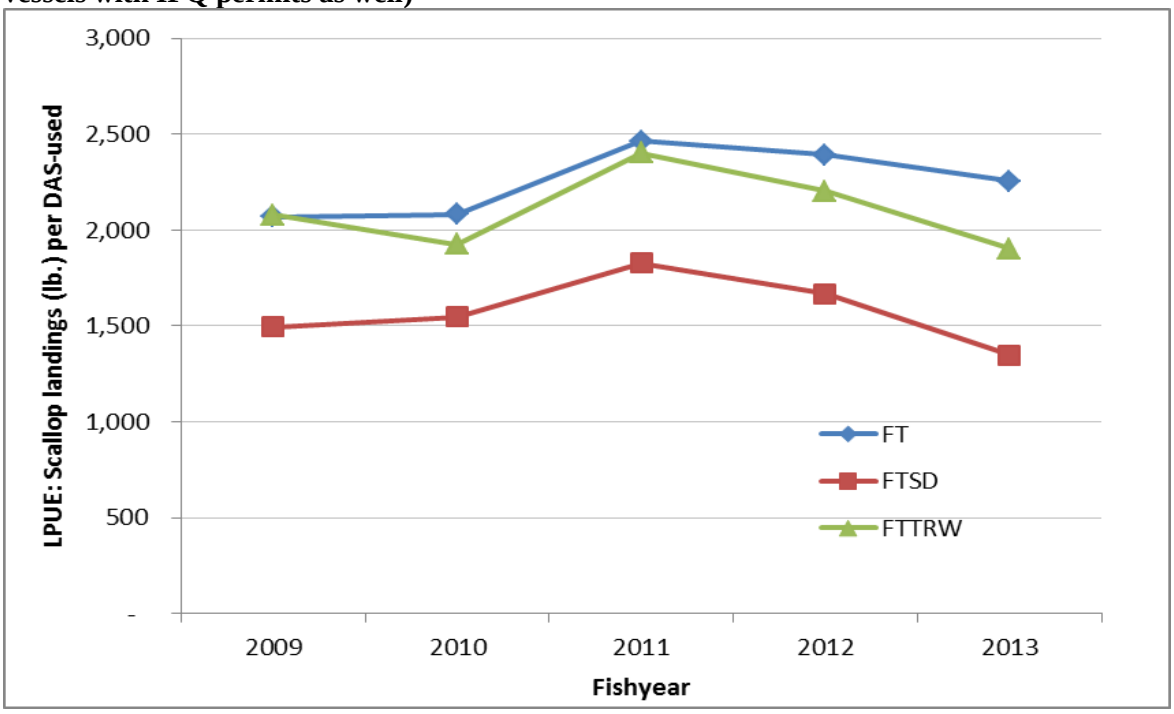
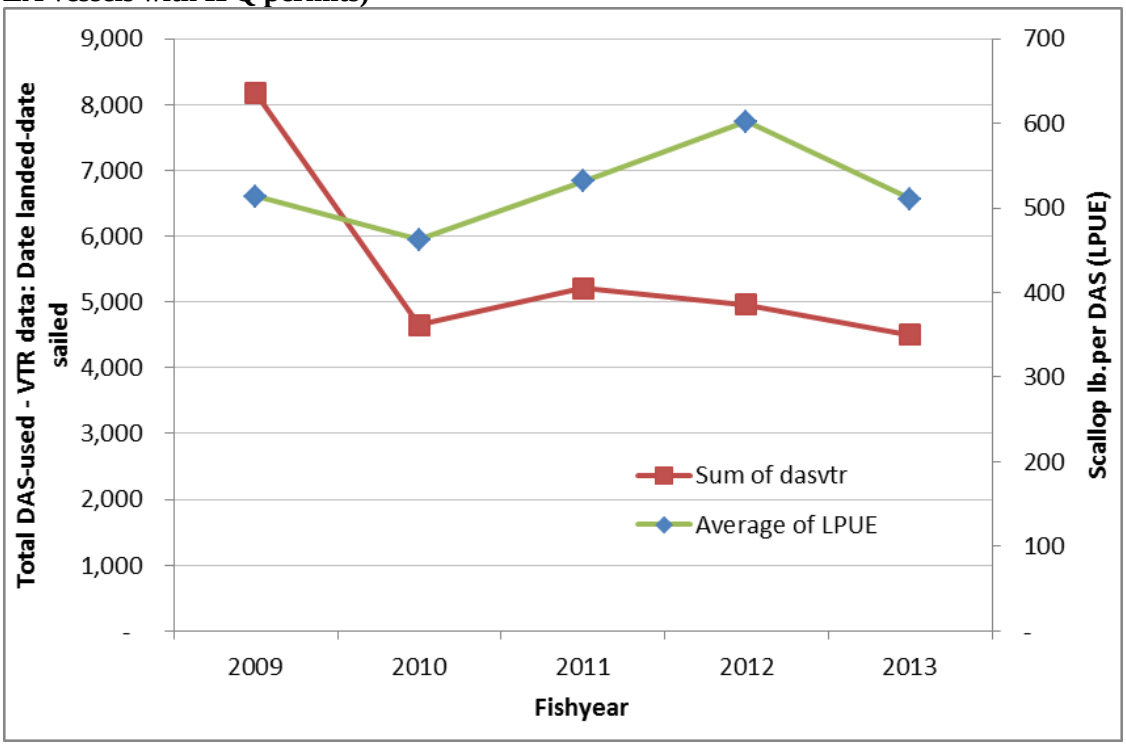


Figure 33 - LPUE and DAS-used for LAGC-IFQ vessels (VTR data includes steam time, excluding LA vessels with IFQ permits)



4.4.7 Trends in the meat count and size composition of scallops

Average scallop meat count has declined continuously since 1999 as a result of effort-reduction measures, area closures, and an increase in ring sizes implemented by the Sea Scallop FMP. The share of larger scallops increased with the share of U10 scallops rising to over 20% during 2006-2008, to 15% in 2009 -2011, to about 20% in 2012-2013 and to 26% in 2014 fishing year compared to less than 10% in 2000-2004. Similarly, the share of 11-20 count scallops increased from 13% in 1999 to 79% in 2011, but declined to 60% in 2014 fishing year. On the other hand, the share of 30 or more count scallops declined from 37% in 1999 to 1% or less since 2008 (Table 27). Larger scallops priced higher than the smaller scallops contributed to the increase in average scallop prices especially since 2010 (Table 29 and Figure 26).

Table 26 - Scallop landings by market category (including landings by all permit categories excluding unknown category)

Fishyear	Under 10 Count	11-20 Count	21-30 Count	>30 Count	Grand Total
1999	3,690,533	2,613,754	6,195,369	7,365,692	19,865,348
2000	2,393,703	6,771,024	14,364,895	7,282,469	30,812,091
2001	1,520,424	10,783,931	24,596,256	4,587,499	41,488,110
2002	2,484,107	7,436,720	34,083,568	2,133,778	46,138,173
2003	3,644,668	12,221,010	31,844,817	1,755,259	49,465,754
2004	5,105,290	28,928,288	24,986,628	588,931	59,609,137
2005	6,906,267	31,608,791	11,482,597	1,126,285	51,123,940
2006	13,273,263	28,801,692	10,772,955	705,158	53,553,068
2007	14,903,951	32,021,763	7,518,148	2,227,602	56,671,464
2008	12,293,851	27,677,737	10,229,476	366,744	50,567,808
2009	8,420,979	35,689,194	12,145,131	172,383	56,427,687
2010	8,737,293	35,978,383	10,932,767	66,311	55,714,754
2011	8,564,518	45,261,304	3,247,867	309,435	57,383,124
2012	10,546,525	41,957,522	3,499,366	77,778	56,081,191
2013	8,663,797	24,740,353	5,594,132	131,537	39,129,819
2014	8,044,488	19,053,052	4,091,161	291,228	31,479,929

Table 27 - Size composition of scallops (excluding unknown category)

Fishyear	UNDER 10 COUNT	11-20 COUNT	21-30 COUNT	>30 COUNT	Grand Total
1999	19%	13%	31%	37%	100%
2000	8%	22%	47%	24%	100%
2001	4%	26%	59%	11%	100%
2002	5%	16%	74%	5%	100%
2003	7%	25%	64%	4%	100%
2004	9%	49%	42%	1%	100%
2005	14%	62%	22%	2%	100%
2006	25%	54%	20%	1%	100%
2007	26%	57%	13%	4%	100%
2008	24%	55%	20%	1%	100%
2009	15%	63%	22%	0%	100%
2010	16%	65%	20%	0%	100%
2011	15%	79%	6%	1%	100%
2012	19%	75%	6%	0%	100%
2013	22%	63%	14%	0%	100%
2014	26%	61%	13%	1%	100%

Table 28 - Composition of scallop revenue by size (excluding unknown category)

Fishyear	U10	11-20	21-30	31+	Grand Total
2008	25.15%	54.44%	19.73%	0.69%	100.00%
2009	18.58%	60.66%	20.48%	0.27%	100.00%
2010	20.41%	59.53%	19.93%	0.12%	100.00%
2011	15.28%	78.31%	5.88%	0.53%	100.00%
2012	19.70%	74.00%	6.16%	0.14%	100.00%
2013	23.65%	61.84%	14.19%	0.32%	100.00%
2014	28.65%	58.16%	12.39%	0.80%	100.00%

Table 29 - Price of scallop by market category (in 2014 inflation adjusted prices)

Fishyear	UNDER 10 COUNT	11-20 COUNT	21-30 COUNT	>30 COUNT	Grand Total
1999	8.4	8.6	7.9	7.0	7.7
2000	9.3	7.1	6.3	6.4	6.7
2001	7.8	5.0	4.7	4.8	4.9
2002	7.2	5.2	4.9	5.7	5.1
2003	6.3	5.2	5.3	5.8	5.4
2004	7.5	6.5	6.1	6.3	6.4
2005	9.5	9.3	9.2	9.1	9.3
2006	7.0	7.7	8.1	8.0	7.6
2007	7.8	7.5	7.2	6.7	7.5
2008	7.8	7.5	7.4	7.2	7.6
2009	8.8	6.8	6.7	6.4	7.1
2010	11.4	8.1	8.8	9.1	8.7
2011	10.6	10.3	10.8	10.2	10.4
2012	10.5	9.9	10.0	9.9	10.0
2013	12.5	11.5	11.6	11.3	11.7
2014	14.0	12.0	11.9	10.8	12.5

Monthly distribution of scallop landings by market category shows that landings as a percent of annual totals were, in general higher in months April to July in years 2009 to 2014. Table 30 highlights the months when U10 landings as a total of annual U10 landings were 19% or higher. In recent years, again the bulk of U10 landings occurred in months of April through August. However, that wasn't the case in 2009, 2010 and 2011 when the majority of U10 landings occurred respectively in June (36% in 2009), in July (54% in 2010) and August (41% in 2011). Table 31 shows the ex-vessel prices by month and market category. In general, the prices were higher in winter months corresponding to lower landings. However, there are no clear trends from year to year when prices for each size category were higher in some months compared to the other months. This is because the change in import prices, in size composition of landings and changes in other factors that affect the supply and demand for exports have impacts on the monthly and annual scallop prices for each size category (See Appendix 1, Price Model).

Table 30 - Monthly distribution of scallop landing by market category

		Month											
Year	**Meat count**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
2009	NA	0%	0%	3%	20%	13%	21%	13%	9%	5%	9%	5%	2%
	U10	3%	3%	10%	9%	12%	36%	10%	8%	5%	4%	1%	1%
	11-20	2%	2%	12%	15%	17%	15%	12%	11%	6%	4%	3%	1%
	21-30	6%	8%	6%	2%	5%	5%	7%	8%	12%	8%	17%	16%
	31 plus	0%	1%	1%	1%	1%	2%	0%	3%	15%	17%	9%	51%
2009 Total		**3%**	**3%**	**11%**	**12%**	**14%**	**16%**	**11%**	**10%**	**7%**	**5%**	**5%**	**4%**
2010	NA	4%	5%	6%	10%	15%	15%	33%	8%	0%	0%	3%	1%
	U10	1%	1%	5%	9%	9%	10%	54%	7%	3%	1%	1%	1%
	11-20	1%	2%	8%	17%	18%	15%	9%	11%	10%	3%	4%	2%
	21-30	11%	8%	12%	6%	5%	4%	1%	6%	9%	17%	12%	9%
	31 plus	64%	2%	1%	1%	0%	1%	0%	1%	1%	13%	16%	0%
2010 Total		**3%**	**3%**	**8%**	**13%**	**14%**	**12%**	**14%**	**9%**	**9%**	**6%**	**5%**	**3%**
2011	NA	0%	0%	0%	6%	3%	7%	6%	51%	22%	4%	0%	0%
	U10	1%	1%	3%	8%	13%	9%	7%	41%	10%	4%	2%	2%
	11-20	1%	3%	10%	12%	17%	14%	9%	12%	9%	6%	5%	3%
	21-30	22%	12%	13%	5%	3%	2%	1%	1%	6%	15%	12%	8%
	31 plus	2%	0%	13%	67%	16%	0%	0%	0%	0%	0%	0%	1%
2011 Total		**2%**	**3%**	**9%**	**11%**	**16%**	**12%**	**8%**	**16%**	**9%**	**6%**	**5%**	**3%**
2012	NA	8%	3%	0%	6%	0%	30%	19%	13%	9%	0%	4%	8%
	U10	1%	0%	3%	7%	12%	20%	25%	15%	7%	4%	2%	4%
	11-20	2%	3%	12%	13%	16%	15%	10%	10%	7%	6%	3%	3%
	21-30	9%	13%	8%	8%	10%	7%	4%	6%	8%	13%	8%	6%
	31 plus	1%	8%	0%	0%	0%	0%	0%	0%	0%	37%	54%	0%
2012 Total		**2%**	**3%**	**10%**	**11%**	**15%**	**15%**	**13%**	**11%**	**7%**	**6%**	**3%**	**4%**
2013	NA	0%	0%	0%	3%	23%	29%	20%	11%	11%	1%	1%	0%
	U10	2%	2%	5%	14%	17%	17%	19%	12%	7%	3%	1%	1%
	11-20	5%	4%	7%	14%	23%	14%	11%	9%	7%	3%	1%	1%
	21-30	4%	1%	9%	12%	3%	10%	14%	14%	14%	8%	6%	7%
	31 plus	5%	0%	0%	2%	7%	0%	0%	0%	2%	3%	50%	31%
2013 Total		**4%**	**3%**	**7%**	**14%**	**19%**	**14%**	**13%**	**10%**	**8%**	**4%**	**2%**	**2%**
2014	NA	0%	2%	0%	18%	4%	38%	17%	6%	15%	0%	0%	0%
	U10	1%	2%	3%	18%	22%	19%	14%	13%	6%	1%	0%	0%
	11-20	2%	4%	5%	18%	19%	14%	15%	10%	8%	2%	1%	1%
	21-30	7%	11%	5%	2%	4%	11%	8%	13%	13%	9%	9%	9%
	31 plus	1%	1%	1%	0%	2%	3%	0%	13%	4%	19%	19%	37%
2014 Total		**2%**	**5%**	**5%**	**15%**	**17%**	**15%**	**14%**	**11%**	**8%**	**3%**	**2%**	**2%**
Grand Total		**3%**	**3%**	**9%**	**12%**	**15%**	**14%**	**12%**	**11%**	**8%**	**5%**	**4%**	**3%**

Table 31 - Scallop ex-vessel prices by month and market category (in current prices)

		Month											
Year	**Meat count**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
2009	NA	7.1	9.8	6.6	6.1	5.9	5.5	6.0	6.1	7.1	6.3	6.9	6.5
	U10	8.4	8.8	7.8	7.9	7.9	7.5	8.2	8.5	8.7	8.9	9.4	9.6
	11-20	7.2	7.2	6.4	6.0	6.0	5.8	6.2	6.3	6.7	6.9	7.5	7.9
	21-30	6.9	6.7	6.5	5.9	5.8	5.3	5.9	6.1	6.3	6.3	6.5	6.2
	31 plus	5.6	6.5	5.8	5.4	6.2	5.1		6.2	6.1	5.9	6.2	5.7
2009 Total		**7.4**	**7.5**	**6.8**	**6.6**	**6.6**	**6.4**	**6.8**	**6.8**	**7.2**	**7.2**	**7.3**	**7.1**
2010	NA	6.9	8.2	5.5	6.5	7.4	7.9	9.6	6.4			6.4	9.5
	U10	9.2	10.7	11.2	10.0	10.0	10.2	10.5	9.8	10.0	10.3	10.7	11.1
	11-20	7.8	8.2	7.8	6.8	6.7	7.2	8.7	8.2	8.6	9.1	9.7	10.0
	21-30	5.8	6.2	6.5	6.3	6.2	6.5	8.2	8.2	8.5	8.5	9.2	9.5
	31 plus	5.4	5.5	5.8	2.9		6.0		7.5	7.5	8.4	9.1	8.7
2010 Total		**6.9**	**7.8**	**8.3**	**7.8**	**7.7**	**8.1**	**9.7**	**8.7**	**8.9**	**9.1**	**9.6**	**9.9**
2011	NA	10.6	9.6		9.7	22.3	9.8	9.9	9.9	10.5	24.8		
	U10	11.2	11.1	10.4	10.5	10.3	10.3	10.3	9.7	10.7	10.8	11.3	11.6
	11-20	10.2	9.6	9.3	9.7	9.8	9.5	9.8	9.9	10.4	10.3	10.7	11.0
	21-30	9.6	9.3	9.2	9.7	9.8	9.7	10.3	10.8	10.6	10.2	10.5	10.7
	31 plus	9.0	8.5	8.5	9.2	9.5				10.7		10.5	10.7
2011 Total		**10.1**	**9.8**	**9.5**	**9.9**	**10.1**	**9.8**	**10.0**	**9.8**	**10.5**	**10.6**	**10.7**	**11.0**
2012	NA	10.1	11.1		10.6	10.2	7.9	9.4	10.1	10.0		10.3	10.3
	U10	12.0	12.0	11.0	11.1	10.3	9.2	9.6	10.3	10.4	11.2	12.3	12.5
	11-20	11.7	10.9	9.8	9.6	9.7	9.0	9.4	10.0	10.0	10.2	10.9	10.6
	21-30	11.2	10.7	9.6	9.3	9.7	9.5	9.3	9.8	9.7	10.0	10.2	10.0
	31 plus	11.5	10.1								9.7	9.8	
2012 Total		**11.6**	**11.0**	**10.0**	**9.9**	**9.9**	**9.1**	**9.5**	**10.1**	**10.1**	**10.4**	**11.1**	**11.1**
2013	NA	0.5			6.1	0.0	3.1	3.5	6.6	6.5	12.1	9.2	12.0
	U10	12.2	12.3	12.4	11.9	11.3	12.4	12.3	12.1	12.7	13.3	14.2	14.9
	11-20	10.9	10.9	11.1	10.9	10.5	10.9	11.6	12.0	12.2	12.5	13.4	13.6
	21-30	10.2	10.5	10.4	10.6	10.3	10.6	11.4	11.8	11.8	11.9	12.3	12.3
	31 plus	10.1			10.0	9.7	9.0		11.4	7.9	11.4	11.6	10.9
2013 Total		**11.2**	**11.3**	**11.3**	**11.1**	**10.7**	**11.3**	**11.7**	**11.9**	**12.2**	**12.6**	**13.1**	**13.4**
2014	NA	7.0	15.5		13.2	12.1	12.4	10.1	9.3	13.0			95.5
	U10	15.2	15.1	16.1	13.9	12.3	14.2	14.7	14.4	14.3	15.7	16.1	16.0
	11-20	14.1	13.3	13.5	11.7	11.2	12.3	12.6	12.5	12.4	13.7	14.2	13.8
	21-30	12.8	11.8	11.9	11.7	11.1	12.2	12.3	12.3	12.1	12.5	12.4	11.4
	31 plus	11.7	11.0	11.0		10.3	11.6	11.2	11.9	12.3	12.2	11.6	9.3
2014 Total		**13.9**	**13.3**	**13.8**	**12.6**	**11.7**	**13.1**	**13.3**	**13.2**	**13.0**	**13.9**	**13.5**	**13.6**

4.4.8 Trends in permits by permit plan and category

Table 32 shows the number of limited access vessels by permit category from 2003 to 2014. The fishery is primarily full-time, with a small number of part-time permits. There are no occasional permits left in the fishery since 2009 because these were converted to part-time small dredge. Of these permits, the majority is dredge vessels, with a small number of full-time small dredge and full-time trawl permit holders. The permit numbers shown in Table 32 include duplicate entries because replacement vessels receive new permit numbers and when a vessel is sold, the new owner would get a new permit number. The unique vessels with right-id numbers are shown in Table 34 for 2008-2012. For example, only 347 out of 356 permits in 2008 belonged to unique vessels. The number of LAGC permits held by limited access vessels is shown in Table 33.

Table 32 - Number of limited access vessels by permit category and gear

Permit category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Full-time	242	248	255	256	254	259	252	253	257	254	251	249
Full-time small dredge	48	57	59	63	56	55	54	53	53	52	52	50
Full-time net permit	15	19	14	12	11	11	11	11	11	12	12	11
Total full-time	305	324	328	331	321	326	317	316	321	318	315	310
Part-time	4	3	3	2	2	2	2	2	2	2	2	2
Part-time small dredge	26	30	34	35	32	34	34	32	33	32	33	30
Part-time trawl	3	-	-	-	-	-	-					
Total part-time	33	33	37	37	34	37	38	34	35	34	35	32
Occasional	3	1	2	1	1	-	-	-				
Occasional trawl	5	5	-	-	-	-	-	-				
Total occasional	8	6	2	1	1	0	0	0	0	0	0	0
Total Limited access	346	363	367	369	356	361	353	351	356	352	350	342

** As of June 2015. Note: The permit numbers above include duplicate entries because replacement vessels receive new permit numbers and when a vessel is sold, the new owner would get a new permit number.*

Table 33 - LAGC permits held by limited access vessels by permit category

AP-YEAR	IFQ	NGOM	Incidental
2008	41	19	87
2009	43	28	116
2010	40	28	114
2011	42	28	114
2012	41	27	119
2013	41	27	118
2014	40	27	116
2015	40	27	112

Note: The permit numbers above include duplicate entries because replacement vessels receive new permit numbers and when a vessel is sold, the new owner would get a new permit number. 2014 numbers are preliminary.

Table 34 - Scallop Permits by unique right-id and category by application year

Permit category	2008	2009-2015
Full-time	250	250
Full-time small dredge	52	52
Full-time net boat	11	11
Total full-time	**313**	**313**
Part-time	2	2
Part-time small dredge	31	32
Part-time trawl	0	0
Total part-time	**33**	**34**
Occasional	1	0
Total Limited access	347	347

Table 35 shows that the number of general category permits, including permits held by LA vessels, declined considerably after 2007 as a result of the Amendment 11 provisions. Although not all vessels with general category permits were active in the years preceding 2008, there is no question that the number of vessels (and owners) that hold a limited access general category permit under the Amendment 11 regulations are less than the number of general category vessels that were active prior to 2008 (Table 35). The numbers of LAGC permits by category, excluding the LA vessels that also have an LAGC permit, are shown in **Table 36**. The number of permits includes the permits of the replacement vessels within a given year.

Table 35 - General category permit before and after Amendment 11 implementation (including the LA vessels with LGC permits)

AP_YEAR		Number of permits qualify under Amendment 11 program			Grand Total
	General category permit (up to 2008)	Limited access general category (A)	Limited access NGOM permit (B)	Incidental catch permit (C)	
2000	2263				2263
2001	2378				2378
2002	2512				2512
2003	2574				2574
2004	2827				2827
2005	2950				2950
2006	2712				2712
2007	2493				2493
2008		342	99	277	718
2009		344	127	301	772
2010		333	122	285	740
2011		288	103	279	670
2012		290	110	280	680
2013		278	97	282	657
2014		260	103	260	623
2015*		242	90	242	574

*Preliminary numbers as of June 2015.

Table 36 - LAGC permits after Amendment 11 implementation (excluding the LAGC permits held by limited access vessels)

AP-YEAR	IFQ	NGOM	Incidental
2008	280	79	173
2009	304	100	190
2010	293	94	172
2011	248	82	166
2012	237	70	163
2013	222	77	149
2014	220	76	144
2015	202	63	130

Note: 2015 is preliminary (as of June 2015)

The trends in the estimated number of active limited access vessels are shown in Table 37 by permit plan.
Table 38 shows the number of active LAGC vessels by permit category excluding those LA vessels which have both LA and LAGC permits. Although the number of active permits (128 in 2014) are higher in 2014 compared to the 2013 fishing year, this may be due either an increase in the number of participating vessels or an increase in permits due to vessel replacements or transfers.

Table 37 - Active vessels by fishyear and permit category (Vessels that landed any amount of scallops, Dealer Data)

Fishyear	FT	PT	FTSD	PTSD	FTTRW	PTTRW	OCTRW	Grand Total
1994	188	9	3	4	24	17	13	258
1995	185	9	2	2	24	12	8	242
1996	183	11	2	5	22	17	6	246
1997	176	8		4	18	16	3	225
1998	182	5	1	2	19	16	2	227
1999	196	8	1	3	14	16	6	244
2000	206	10	1	3	16	16	6	258
2001	212	12	11	6	16	17	6	280
2002	217	12	24	7	16	9	5	290
2003	225	10	30	12	15	6	3	301
2004	230	4	42	18	13	3	3	313
2005	234	3	50	23	12		2	324
2006	243	2	49	28	12			334
2007	248	2	53	30	11			344
2008	243	2	52	28	11			336
2009	244	2	53	31	11			341
2010	249	2	52	32	11			346
2011	250	2	53	32	11			348
2012	252	2	52	30	11			347
2013	250	2	52	30	11			345
2014	250	2	51	30	11			344

Table 38 - Number of active vessels with LAGC permits by permit category (Dealer data, excludes LA vessels with LAGC permits)

Fishyear	IFQ	NGOM	Incidental	Grand Total
2009	206	11	67	284
2010	147	8	51	206
2011	141	8	56	205
2012	120	12	66	198
2013	115	25	59	199
2014	128	24	58	210

4.4.9 Trends in landings by permit category, state and port, and gear type

4.4.9.1 Landings by permit category

Table 39 through Table 40 describes scallop landings by limited access vessels by gear type and permit category. These tables were obtained by combining the dealer and permit databases.

Most limited access category effort is from vessels using scallop dredges, including small dredges. The number of full-time trawl permits has decreased continuously and has been at 11 full-time trawl permitted vessels since 2008 (Table 32). Furthermore, according to the 2009-2011 VTR data, the majority of these vessels (10 out of 11 in 2010) landed scallops using dredge gear even though they had a trawl permit. There has also been an increase in the numbers of full-time and part-time small dredge vessels after 2002.

Table 40 shows the percent of limited access landings by permit and year. In terms of gear, majority of the scallop landings by the limited access vessels were with dredge gear including the small dredges, with significant amounts also landed by full-time and part-time trawls until 2000. Table 40 shows that the percentage of landings by FT trawl permits declined after 1998 to about 3% of total limited access scallop landings in 2011. There were only 11 FT trawl permits in 2014. However, 2009-2013 VTR data showed that over 90% of the scallop pounds by the FT trawl permitted vessels are landed using dredge gear (10 vessels) since these vessels are allowed to use dredge gear even though they have a trawl permit. Similarly, all of the part-time trawl and occasional trawl permits are converted to small dredge vessels. Over 84% of the scallop pounds are landed by vessels with full-time dredge and close to 11% landed by vessels with full-time small dredge permits in 2014 fishing year. Including the full-trawl vessels that use dredge gear, the percentage of scallop pounds landed by dredge gear amounted to over 99% of the total scallop landings in 2009-2014.

Table 39 - Scallop landings (lbs.) by limited access vessels by permit category

Fishyear	FT	PT	FTSD	PTSD	FTTRW	PTTRW	OCTRW
1994	12,992,793	77,668	NA	NA	1,804,974	191,825	4,290
1995	13,752,423	205,147	NA	NA	1,477,777	140,178	45,409
1996	14,185,833	259,791	NA	13,336	1,282,612	376,874	93,375
1997	11,078,071	148,742		19,093	773,243	242,396	NA
1998	9,486,893	84,929	NA	NA	1,111,119	351,722	NA
1999	18,877,937	303,397	NA	15,692	1,382,335	564,111	15,950
2000	29,221,728	599,186	NA	80,741	1,871,048	710,032	14,284
2001	38,707,405	861,087	765,342	208,176	2,578,316	744,057	17,062
2002	42,319,380	918,534	1,757,695	269,284	2,980,542	504,441	31,876
2003	45,461,772	932,815	3,125,474	482,472	2,612,065	272,668	NA
2004	48,873,669	323,389	5,654,387	825,223	2,432,866	125,949	NA
2005	37,935,508	236,757	4,788,085	1,379,360	1,250,771		NA
2006	40,846,955	NA**	5,223,125	1,304,877	1,339,748		
2007	43,091,302	NA**	6,917,823	1,601,167	1,678,258		
2008	37,617,260	NA**	6,117,525	1,298,183	1,536,814		
2009	41,266,837	NA**	6,971,699	1,397,169	1,821,156		
2010	42,484,132	NA**	6,774,054	1,927,559	1,790,240		
2011	43,662,880	NA**	6,944,234	1,651,826	1,908,903		
2012	42,781,924	NA**	7,081,245	1,391,171	1,780,017		
2013	30,809,109	NA**	4,057,183	937,523	1,226,997		
2014	24,674,281	NA**	3,126,758	681,917	864,244		

**Note: Although these vessels have trawl permits, majority of these vessels used dredge gear. As a result, over 90% of the scallop landings by the FT trawl permitted vessels are caught using dredge gear in 2009-2010 according to the VTR data.*

*** The landings by part-time vessels are not shown due to the confidentiality requirements since there were less than 3 active PT vessels in those years.*

Table 40 - Percentage of scallop landings (lbs.) by limited access vessels by permit category

Fishyear	FT	PT	FTSD	PTSD	FTTRW	PTTRW	OCTRW
1994	85.93%	0.51%		0.02%	11.94%	1.27%	0.03%
1995	87.74%	1.31%		0.06%	9.43%		0.29%
1996	87.35%	1.60%		0.08%	7.90%	2.32%	0.57%
1997	90.35%	1.21%		0.16%	6.31%	1.98%	0.00%
1998	85.92%	0.77%		0.00%	10.06%	3.19%	0.03%
1999	89.21%	1.43%		0.07%	6.53%	2.67%	0.08%
2000	89.88%	1.84%		0.25%	5.76%	2.18%	0.04%
2001	88.21%	1.96%		0.47%	5.88%		0.04%
2002	86.75%	1.88%	3.60%	0.55%	6.11%		0.07%
2003	85.96%	1.76%	5.91%	0.91%	4.94%		0.00%
2004	83.90%		9.71%	1.42%	4.18%		0.03%
2005	83.18%		10.50%	3.02%	2.74%		0.03%
2006	83.72%		10.70%	2.67%	2.75%		0.00%
2007	80.58%		12.94%	2.99%	3.14%		0.00%
2008	80.41%		13.08%	2.78%	3.29%		0.00%
2009	79.84%		13.49%	2.70%	3.52%		0.00%
2010	79.84%		12.73%	3.62%	3.36%		0.00%
2011	80.29%		12.77%	3.04%	3.51%		0.00%
2012	80.35%		13.30%	2.61%	3.34%		0.00%
2013	82.82%		10.90%	2.56%	3.30%		0.00%
2014	83.77%		10.62%	2.32%	2.93%		0.00%

**Note: Although these vessels have trawl permits, majority used dredge gear in 2009-2010 and over 90% of the scallop landings by the FT trawl permitted vessels are caught using dredge gear during the same years.*

Since 2001, there has been considerable growth in fishing effort and landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. Amendment 11 implemented a limited entry program for the general category fishery allocating 5% of the total projected scallop catch to the general category vessels qualified for limited access. The main objective of the action was to control capacity and mortality in the general category scallop fishery. There is also a separate limited entry program for general category fishing in the Northern Gulf of Maine. In addition, a separate limited entry incidental catch permit was adopted that will permit vessels to land and sell up to 40 pounds of scallop meat per trip while fishing for other species.

During the transition period to the full-implementation of Amendment 11, the general category vessels were allocated 10% of the scallop TAC. Beginning with 2010 fishing year, limited access general category IFQ vessels were allocated 5% of the estimated scallop catch resulting a decline in landings by the general category vessels (Table 41 and Table 42). These tables were obtained from the dealer and permit databases. The trip information obtained from the dealer data shows the permit number but does not specify whether a particular trip was taken as a limited access (LA) or general category (LAGC) trip. Because many vessels had and have both LA and general category permits, to separate the LA trips from LAGC trips for the same vessel

requires some assumptions. If a vessel had both an LA and LAGC-IFQ permit, it was assumed that if scallop landings were equal or less than 400lb. (600lb.) for years up to 2010 (after 2010), that was an LAGC trip. If an LA vessel also had an LAGC-incidental permit, it was assumed that if scallop landings were equal or less than 100lb. that was an LAGC-incidental trip. For the LAGC-NGOM fishery it was assumed that if the scallop landings were equal or less than 200lb., that trip was a LAGC trip, otherwise it was an LA trip. In addition to these issues, there were many trips that were not associated with any valid permit plan (perhaps due to mistakes in the entry of permit number by dealers). Thus, it must be pointed out that the separation of landings by permit plan were estimated from the above assumptions and could differ slightly from actual landings. For example, Table 42 shows that in 2014 fishyear, the *estimated landings* by LAGC vessels including those by vessels with IFQ, NGOM and incidental catch permits and including the LAGC landings by the LA vessels that have both permits, amounted to 7.5% of total scallop landings in that fishyear.

Table 41 - *Estimated Landings* by permit plan before and after Amendment 11 implementation

Fishyear	Gencat & LAGC*	LA	NA	Grand Total
1994	125,001	15,128,621	1,203,669	16,457,291
1995	123,952	15,675,688	1,080,425	16,880,065
1996	213,535	16,234,409	759,431	17,207,375
1997	357,684	12,264,001	825,890	13,447,575
1998	164,185	11,042,134	567,277	11,773,596
1999	150,498	21,160,523	368,907	21,679,928
2000	425,364	32,510,711	354,600	33,290,675
2001	1,649,749	43,882,217	191,046	45,723,012
2002	1,124,933	48,784,134	132,652	50,041,719
2003	1,861,075	52,930,243	301,670	55,092,988
2004	3,699,334	58,288,383	652,773	62,640,490
2005	7,723,080	45,750,967	184,078	53,658,125
2006	7,097,155	48,888,678	288,678	56,274,511
2007	5,488,221	53,560,101	621,568	59,669,890
2008	4,785,198	46,842,633	847,472	52,475,303
2009	4,203,751	51,738,924	2,030,811	57,973,486
2010	2,330,701	53,277,449	1,352,837	56,960,987
2011	3,122,403	54,432,220	924,766	58,479,389
2012	2,962,148	53,296,551	899,001	57,157,700
2013	2,441,871	37,216,834	758,286	40,416,991
2014	2,436,637	29,454,959	664,572	32,556,168

*Includes landings IFQ landings by vessels with LAGC and LA permits.

Table 42 - *Estimated Landings* by permit plan (Dealer Data)

Fishyear	Gencat & LAGC*	LA	NA	Grand Total
1994	0.76%	91.93%	7.31%	100.00%
1995	0.73%	92.87%	6.40%	100.00%
1996	1.24%	94.35%	4.41%	100.00%
1997	2.66%	91.20%	6.14%	100.00%
1998	1.39%	93.79%	4.82%	100.00%
1999	0.69%	97.60%	1.70%	100.00%
2000	1.28%	97.66%	1.07%	100.00%
2001	3.61%	95.97%	0.42%	100.00%
2002	2.25%	97.49%	0.27%	100.00%
2003	3.38%	96.07%	0.55%	100.00%
2004	5.91%	93.05%	1.04%	100.00%
2005	14.39%	85.26%	0.34%	100.00%
2006	12.61%	86.88%	0.51%	100.00%
2007	9.20%	89.76%	1.04%	100.00%
2008	9.12%	89.27%	1.61%	100.00%
2009	7.25%	89.25%	3.50%	100.00%
2010	4.09%	93.53%	2.38%	100.00%
2011	5.34%	93.08%	1.58%	100.00%
2012	5.18%	93.24%	1.57%	100.00%
2013	6.04%	92.08%	1.88%	100.00%
2014	7.48%	90.47%	2.04%	100.00%

**Includes landings by LAGC IFQ, LA IFQ and NGOM and incidental permits.*

The general category scallop fishery has always been a comparatively small but diverse part of the overall scallop fishery. The number of vessels participating in the general category fishery has continued to rise until 2007 when the New England Fisheries Management Council proposed limiting access in response to concerns of redirected effort from other fisheries. When the limited access general category was implemented, in 2008, there was a corresponding decline in the total number of active vessels. Then again in 2010, there was a decline in the number of active general category vessels when the GC IFQ program began and a "hard" Total Allowable Catch of 5% of the total scallop catch limit was established. These declines are evident in Table 41 and Table 42 and in Table 38 where the overall number of active vessels and scallop landings dropped, both in 2008 and in 2010.

4.4.9.2 Number of permit and landings by state and port

The Scallop PDT generally describes changes in the scallop fishery at the community level based on both port of landing, and home port state. A port of landing is the actual port where fish and shellfish have been landed, where a home port is the port identified by a vessel owner on a vessel permit application and is where supplies are purchased and crew is hired. Statistics based on port of landing begin to describe the benefits that other fishing related businesses (such as dealers and processors) derive from the landings made in their port. Alternatively, statistics based on homeport give an indication of the benefits received by vessel owners and crew from

that port. However, during this analysis the PDT observed that many vessels declare a primary port for the year and it does not always match up with the actual port the vessel landed the majority of scallop catches for the year. Therefore, these results should take that into consideration.

In terms of home state, the majority of the limited access vessels are from MA, followed by NJ, VA and NC (Table 43). The same is true in terms of primary state of landing, however, the number of vessels with a primary port of VA has increased and those with a primary port of NC have declined since 2009.

Table 43 - Number of limited access permits by home state (Permit data)

HPST	2009	2010	2011	2012	2013	2014
CT	10	10	10	10	9	9
FL	4	4	4	4	3	3
MA	148	147	152	153	151	149
ME	3	3	3	3	3	3
NC	42	38	39	40	40	40
NJ	92	92	95	94	95	95
NY	3	3	2	2	2	1
PA	5	4	3	3	3	3
RI	3	3	2	2	2	2
VA	44	46	43	45	44	45
Grand Total	**354**	**350**	**353**	**356**	**352**	**350**

The largest numbers of permitted limited access scallop vessels have home ports of New Bedford, MA and Cape May, NJ, which represent 39% and 21% of all limited access vessels, respectively (Table **44**). The number of vessels homeported in some ports on the periphery of scallop fishing grounds has declined over time. Many ports have remained relatively stable in terms of LA vessels, but in ports like Newport News, VA and Norfolk, VA the number of LA vessels homeported in those areas has decreased between 2001 and 2011. On the other hand, some southern ports like New Bern, NC, Beaufort, NC and Seaford, VA have seen increases in the number of LA vessels homeported in those areas. Several southern ports have remained constant such as Wanchese, NC, Lowland NC, and Hampton, VA. Highlighting the difference between port of landing and home port however, are ports like New Bern, NC and Wanchese, NC, both of which are the home ports of a number of vessels with scallop landings but where no (or very little) landings were made. It should also be noted that some scallop companies have merged over time, and while a vessel may still be homeported in one state, it may actually be owned by a company from another state, and product landed in that state compared to the homeport of the vessel. These nuances cannot easily be tracked.

Table 44 - Number of permitted limited access scallop vessels. By homeport, 2001-2014

State	Homeport	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
MA	NEW BEDFORD	90	97	102	111	125	131	133	132	134	133	137	139	136	134
NJ	CAPE MAY	36	42	50	54	68	71	73	68	67	67	73	75	76	76
VA	NEWPORT NEWS	21	21	21	22	23	19	19	18	17	18	16	17	17	17
VA	SEAFORD	2	3	4	4	5	5	5	5	6	7	12	14	13	13
NC	NEW BERN	8	8	8	8	13	12	14	11	12	11	11	10	11	11
NJ	BARNEGAT LIGHT	9	8	8	10	11	10	10	10	10	10	10	10	10	10
NC	WANCHESE	8	7	7	6	6	8	8	8	8	8	8	8	8	8
NC	LOWLAND	7	7	8	9	8	8	8	7	7	7	7	7	7	6
NJ	POINT PLEASANT	3	3	3	4	3	3	3	6	7	9	6	4	4	4
VA	HAMPTON	6	6	6	7	4	8	6	6	6	5	6	6	6	7
CT	NEW LONDON	1	1	1	1	3	5	5	5	5	5	5	5	4	4
MA	BOSTON	12	11	10	7	7	7	7	6	5	6	5	4	4	5
MA	FAIRHAVEN	10	8	8	7	8	7	5	4	4	4	5	6	7	7
NC	BEAUFORT							1	2	5	4	5	6	5	5
VA	NORFOLK	27	27	27	22	13	11	11	11	11	12	5	4	4	4
CT	STONINGTON	4	6	7	7	4	4	5	4	4	4	4	4	4	4
PA	PHILADELPHIA	5	5	6	6	5	5	5	5	5	4	3	3	3	3
RI	POINT JUDITH	1	1	2	1	2	3	3	3	3	2	3	2	2	2

In terms homeport state, most LA landings were from vessels with homeports in MA, followed by NJ, then VA and NC (Table 24). The results are very similar when summarized by the primary port identified by the vessel, with some important differences. For example, vessels with homeports in some states like Florida, Pennsylvania and Rhode Island are not landing scallops in those states, so the catch is distributed in other primary states of landing such as MA, NJ, and VA (Table 47). For North Carolina for example, more catch is attributed to vessels homeported in NC, but much of those landings are being landed in other states. Furthermore, there are still vessels that declare the primary port to be NC, but based on dealer records, that catch is not being landed in NC.

Table 45 - Number of limited access permits by primary state (Permit data)

PPST	2009	2010	2011	2012	2013	2014
CT	10	10	10	10	9	9
MA	149	148	153	154	152	151
ME	3	3	3	3	3	3
NC	26	24	24	25	26	26
NJ	97	94	97	97	97	95
NY	2	3	2	2	2	1
PA	1	1	1	1	1	1
RI	3	3	2	2	2	2
VA	63	64	61	62	60	62
Grand Total	**354**	**350**	**353**	**356**	**352**	**350**

Table 46 - Scallop landings (lb.) by home state of landing for limited access vessels (excluding LAGC trips)

Home State	2009	2010	2011	2012	2013	2014
CT	1,786,264	1,629,919	1,702,981	1,734,927	1,133,957	834,479
FL	635,381	513,461	691,611	538,642	311,395	230,598
MA	24,233,341	25,599,643	25,417,196	25,655,744	18,005,451	14,526,286
ME	365,003	427,946	493,777	506,692	295,863	218,366
NC	5,200,091	4,655,988	5,242,348	5,317,039	3,121,677	2,848,100
NJ	11,840,288	13,022,734	13,257,807	12,362,825	9,388,867	7,523,201
NY	477,178	377,581	230,739	302,011	190,902	58,602
PA	717,292	555,580	417,780	392,613	255,390	250,701
RI	135,255	367,124	371,925	382,428	284,240	231,057
VA	6,663,213	6,655,381	7,195,533	6,137,427	4,920,680	4,108,925

Table 47 - Scallop landings by primary state of landing for limited access vessels

Primary State	2009	2010	2011	2012	2013	2014
CT	1,786,264	1,629,919	1,702,981	1,734,927	1,133,957	834,479
FL	24,378,487	25,711,381	25,503,567	25,776,580	18,150,126	14,617,040
MA	365,003	427,946	493,777	506,692	295,863	218,366
ME	2,830,019	2,535,099	2,784,913	2,873,661	1,848,398	1,320,782
NC	12,300,667	13,265,059	13,612,857	12,632,698	9,322,872	7,659,945
NJ	285,243	361,900	230,739	302,011	190,902	58,602
NY	184,108	148,263	171,625	198,809	131,568	84,428
PA	135,255	367,124	371,925	382,428	284,240	231,057
RI	9,788,260	9,358,666	10,149,313	8,922,542	6,550,496	5,805,616
VA	1,786,264	1,629,919	1,702,981	1,734,927	1,133,957	834,479

LAGC IFQ vessels are distributed up and down the coast as well. The number of LAGC IFQ trips for these vessels have been summarized by both homeport state and primary port state as identified by the permit owner (Table 48 and Table 49). There are some differences, but overall, the numbers of permits were similar. The vessels homeported in MA and NJ landed the major proportion of scallops since 2009 (Table 50).

Table 48 - Number of LAGC-IFQ permits by home state (excludes LA vessels, Permit data)

HPST	2008	2009	2010	2011	2012	2013	2014
CT	5	5	4	1	3	3	3
DE	3	3	3	3	3	3	3
FL	2	2					
GA	2	1	1				
MA	98	111	107	95	89	84	79
MD	7	11	10	9	8	7	5
ME	26	22	16	12	11	8	6
NC	32	39	40	30	29	25	21
NH	9	10	7	6	6	5	5
NJ	62	69	75	62	56	57	53
NY	19	20	17	17	18	17	17
PA	1	1	1	1	1	1	1
RI	5	5	6	7	7	6	6
TX					1	1	1
VA	9	5	6	5	5	5	4
Grand Total	**280**	**304**	**293**	**248**	**237**	**222**	**204**

Table 49 - Number of LAGC-IFQ permits by primary state (excludes LA vessels, Permit data)

PPST	2008	2009	2010	2011	2012	2013	2014
CT	5	5	4	1	3	3	3
DE	1	1	1	1	1	1	1
FL	2	3	1	1			
GA	2	1	1				
MA	101	113	109	97	90	85	80
MD	10	14	13	12	11	10	8
ME	23	20	14	11	11	8	6
NC	30	36	39	29	30	26	22
NH	8	9	6	5	5	4	4
NJ	64	70	75	62	56	57	53
NY	18	20	17	17	18	17	17
RI	6	6	7	7	7	6	6
VA	10	6	6	5	5	5	4

Table 50 - Scallop landings(lb.) by home state for LAGC-IFQ vessels (excluding IFQ trips by LA vessels, dealer and permit data)

Home State	2009	2010	2011	2012	2013	2014
CT	44,704	6,191	6,644	44,958	18,421	25,007
DE	6,314	10,810	12,908	13,649	6,745	6,294
GA	37,090	10,258				
MA	582,248	560,610	955,898	1,087,646	918,392	645,607
MD	256,295	58,850	58,671	53,159	24,923	43,770
ME	97,090	29,541	60,590	36,852	NA	60,737
NC	478,256	238,981	315,672	170,389	191,439	156,873
NH	26,758	NA	10,225	9,252	9,148	11,676
NJ	1,304,558	769,107	1,053,814	1,023,063	823,277	832,510
NY	258,373	176,558	188,235	256,211	221,668	211,917
PA	8,726	8,859	NA	9,226	NA	NA
RI	38,218	24,277	43,546	72,127	56,405	46,095
TX				18,450	11,270	12,658
VA	88,466	43,513	52,452	48,542	30,423	17,236

**Notes: "NA" indicates that either there were no landings or that the data could not be shown for the confidentiality reasons because the number of vessels was less than 3.*

Table 51 - Scallop landings(lb.) by primary state for LAGC-IFQ vessels (excluding IFQ trips by LA vessels, dealer and permit data)

Primary State	2009	2010	2011	2012	2013	2014
CT	44,704	6,191	6,644	44,958	18,421	25,007
FL	29,631	29,595				
GA	37,090	10,258				
MA	582,248	563,677	960,933	1,096,411	926,531	651,725
MD	270,386	82,643	85,901	79,236	44,895	59,356
ME	88,157	29,541	60,590	36,852	673	60,737
NC	441,846	208,600	306,719	181,162	193,899	154,489
NH	26,758		NA	NA	NA	5,558
NJ	1,313,080	777,558	1,059,406	1,032,289	827,124	832,590
NY	258,373	176,558	188,235	256,211	221,668	211,917
RI	47,151	24,277	43,546	72,127	56,405	46,095
VA	87,672	31,724	47,083	43,791	26,006	22,986

4.4.10 Trip and Fixed Costs for scallop vessels

4.4.10.1 Trips Costs

Data for variable costs, i.e., trip expenses include food, fuel, oil, ice, water and supplies and obtained from observer cost data for 1994-2014. Because of the increase in fuel prices in 2011, the share of fuel costs increased to 80% of the total trip cost and average trip cost per DAS for

the full-time dredge vessels amounted to over $1950 per day-at-sea (Table 53). Average trip costs for full-time small dredge vessels were about $1250 per day-at-sea in 2011 (Table 55).

Table 52 - Observer data information for full-time dredge vessels

Fishyear	Number of trips	Scallop lb. per trip	Average DAS fished	Average LPUE (lb./DAS all areas)	Average crew per trip
1994	17	5090	12.65	399	6.6
1995	18	5852	10.67	494	6.7
1996	34	6591	12.71	487	6.0
1997	22	6085	13.32	444	6.2
1998	12	6699	7.83	2380	5.7
1999	68	11115	8.16	1446	6.5
2000	237	11155	7.07	1724	6.5
2001	85	18030	9.76	1897	7.0
2002	99	17026	9.94	1681	7.0
2003	96	19816	10.61	1843	7.0
2004	220	18466	8.45	2215	6.9
2005	134	18315	9.39	2028	6.9
2006	123	13580	7.58	1873	6.9
2007	204	15572	7.82	2111	6.8
2008	150	16541	8.17	2101	6.8
2009	96	18711	9.02	2048	7.0
2010	77	18093	8.40	2099	6.9
2011	103	19821	8.18	2388	7.1
2012	131	21489	9.05	2311	7.1
2013	92	18650	8.28	2261	6.9
2014	74	18303	8.74	2038	7.0
1994-2014 average	**2092**	**16306**	**8.66**	**1952**	**6.8**

Table 53 - Fuel and total trip costs for FT dredge vessels (in 2013 inflation adjusted prices)

Fishyear	Average fuel price	Average fuel costs per DAS	Average trip costs per DAS*	Average total trip costs per trip*	Average fuel costs per trip	Fuel costs as a % of total trip costs
1994	4.0	2235	2450	31352	28999	92%
1995	3.2	2055	2183	24509	23586	96%
1996	3.9	2311	2566	32028	28917	90%
1997	3.1	1845	2169	28466	24676	87%
1998	3.7	2128	2631	21869	18443	84%
1999	1.4	2095	2137	19290	18994	98%
2000	3.6	1893	2130	14473	12974	90%
2001	3.7	1721	1977	18938	16972	90%
2002	3.8	1936	2169	21380	19442	91%
2003	3.3	1838	2063	21248	19520	92%
2004	3.4	1788	2118	17681	15109	85%
2005	3.4	1811	2086	19073	16791	88%
2006	3.2	1703	1960	14414	13181	91%
2007	3.3	1778	2152	16711	14159	85%
2008	3.6	1802	1976	15524	14406	93%
2009	3.6	2027	2065	18889	18675	99%
2010	3.5	1947	2264	18528	16436	89%
2011	3.6	1918	2117	17343	15907	92%
2012	3.5	2039	2226	19004	18150	96%
2013	3.6	2070	2171	17508	16745	96%
2014	3.7	2386	2606	22580	21091	93%
1994-2014 average	**3.4**	**1897**	**2139**	**18241**	**16530**	91%

***Includes fuel, supply and damage costs**

Table 54 - Observer data information for the full-time small dredge vessels

Fishyear	Number of trips	Average Scallop lb. per trip	Average DAS fished per trip	Average LPUE (lb./DAS all areas)	Average crew per trip
2003	4	5559	5.75	921	5.0
2004	21	10646	9.24	1174	5.0
2005	13	11903	8.54	1349	5.0
2006	18	13841	8.39	1627	5.6
2007	32	11290	7.44	1571	5.4
2008	41	13370	7.37	1774	5.3
2009	22	10168	6.32	1405	5.3
2010	10	11239	5.90	1870	5.3
2011	16	11863	6.88	1660	5.4
2012	26	13882	7.69	1708	5.3
2013	16	8112	6.13	1211	5.4
2014	9	8562	6.22	1353	4.9
2003-2014	**230**	**11639**	**7.42**	**1531**	**5.3**

Table 55 - Fuel and total trip costs for full-time small dredge vessels (in 2013 inflation adjusted prices)

Fishyear	Average fuel price	Average fuel costs per DAS	Average trip costs per DAS*	Average total trip costs per trip*	Average fuel costs per trip
2003	3.0	1606	2268	11457	8439
2004	3.3	916	1132	10867	9047
2005	3.3	1313	1436	11568	10779
2006	3.3	2251	2896	13212	11108
2007	3.4	1380	1754	12264	9789
2008	3.5	1098	1468	10954	8428
2009	3.6	1161	1234	7066	6903
2010	3.3	1106	1243	7277	6511
2011	3.5	1236	1190	8793	9335
2012	3.5	1297	1569	11631	10479
2013	3.8	1367	1823	10788	7515
2014	3.7	1463	1755	10938	9138
Average for 2003-2014	**3.4**	**1305**	**1597**	**10761**	**9080**

***Includes fuel, supply and damage costs**

Table 56 - Observer data information for LAGC IFQ vessels

Fishyear	Number of trips	Average Scallop lb. per trip	Average DAS fished	Average LPUE (lb./DAS all areas)	Average crew per trip
2008	10	323	1.10	313	2.9
2009	13	340	1.00	340	3.0
2010	19	361	1.00	361	2.9
2011	78	438	1.05	430	3.1
2012	44	500	1.00	500	3.4
2013	106	392	1.01	389	2.9
2014	81	416	1.02	412	2.6
2008-2014	**351**	**416**	**1.02**	**412**	**2.9**

Table 57 - Fuel and total trip costs for LAGC IFQ vessels (in 2013 inflation adjusted prices)

Fishyear	Average fuel price	Average fuel costs per DAS	Average trip costs per DAS*	Average total trip costs per trip*	Average fuel costs per trip
2008	4.0	705	829	1197	998
2009	3.4	815	942	1354	1205
2010	3.5	551	568	682	642
2011	3.7	415	486	590	510
2012	3.7	451	472	483	461
2013	3.6	596	668	696	621
2014	3.7	667	821	889	726
Average for 2008-2014	**3.7**	**602**	**693**	**818**	**714**

***Includes fuel, supply and damage costs**

4.4.10.2 Fixed Costs

The fixed costs include those expenses that are not usually related to the level of fishing activity or output. These are insurance, maintenance, license, repairs, office expenses, professional fees, dues, taxes, utility, interest, communication costs, association fees and dock expenses. According to the observer data on fixed costs for the period 2001 to 2007, the fixed costs including maintenance, repairs, engine and gear replacement and hull and liability insurance averaged $191,167 (in 2011 prices) per full-time vessel included in the sample (See Appendix I to Framework 26, Economic Model, Section 1.1.3, Tables 5 to 9).

Table 58 provides updated numbers for the fixed costs for years 2011 and 2012 using the NMFS 2011 and 2012 Cost Surveys. Average fixed costs with and without upgrade costs are much higher in 2011 compared to 2012. However, this is probably because the sample of scallop vessels included each year are different with larger vessels included in 2011. Interestingly, average fixed costs (excluding the upgrade costs) per limited access vessel in 2012 ($212,336) were just slightly higher than average fixed costs estimates for 2001-2007. The 2011-2012

survey data will be combined with the observer and survey data from earlier years to estimate fixed costs functions to simulate those expenses for the limited access fleet.

Table 58 - Fixed costs per vessel by permit category (in current prices)

YEAR	Values	FT	PT	LAGC	Grand Total
2011	Number of vessels	14	4	7	25
	Fixed costs per vessel	329,665	164,371	54,477	226,165
	Fixed costs including upgrade	404,297	201,245	74,427	279,445
	Average HP per vessel	984	478	334	721
	Average length per vessel	87	79	53	76
	Average vessel value	4,215,708	1,750,000	732,143	2,788,717
	Average scallop revenue	1,795,677	527,400	168,911	1,137,258
	% of revenue from scallops	92%	71%	47%	76%
2012	Number of vessels	9		3	12
	Fixed costs per vessel	212,336		66,145	175,789
	Fixed costs including upgrade	287,377		81,178	235,827
	Average HP per vessel	840		487	751
	Average length per vessel	83		50	75
	Average vessel value	3,544,444		383,333	2,754,167
	Average scallop revenue	1,517,900		111,910	1,166,403
	% of revenue from scallops	87%		48%	77%

Main fixed costs items consisted of repairs and maintenance, insurance, interest payments and vessel upgrade (Table 59). It seems repairs and maintenance was quite high in 2011 for the vessels included in the survey which may explain why overall costs were higher in this year. In addition, scallop revenues peaked in 2001 to a total of more than $600 million for the fleet possibly providing more funds and incentive for many vessel owners to invest in repair expenses.

Table 59 - Composition of fixed costs per vessel by permit category (in current prices)

YEAR	Values	FT	PT	LAGC
2011	Number of vessels	14	4	7
	Insurance	82,659	29,843	10,023
	Interest payments	77,148	1,000	7,310
	Repairs and maintenance	127,436	81,157	15,426
	Communications costs	3,678	2,741	2,210
	Haul costs	5,025	15,012	3,914
	Moor	6,708	2,400	2,186
	Shop expenses	9,440	3,500	1,900
	Travel expenses	10,140	1,140	2,288
	Association fees	5,335	2,607	2,300
	Vessel upgrade	74,632	36,874	19,950
2012	Number of vessels	9		3
	Insurance	55,077		8,500
	Interest payments	14,799		5,567
	Repairs and maintenance	65,833		18,467
	Communications costs	3,787		1,687
	Haul costs	6,017		900
	Moor	8,217		2,475
	Shop expenses	12,222		10,683
	Travel expenses	3,063		800
	Association fees	9,147		583
	Vessel upgrade	75,040		15,033

4.4.11 Trends in Foreign Trade

Figure 34 shows scallop exports and imports in pounds including fresh, frozen and processed scallops. Although those numbers possibly include exports of bay, calico or weathervane scallops, it mainly consists of sea scallops.

One of most significant change in the trend for foreign trade for scallops after 1998 was the striking increase in scallop exports. The increase in landings scallops led to a tripling of U.S. exports of scallops from about 5 million pounds in 1998 fishyear to a record amount of 29 million pounds in 2011 fishing year. During the same period, export prices increased as well as scallop landings continued to include a higher proportion of larger sized scallops (Figure 35 and Figure 36). Total exports declined 18 million lb. in 2014 as the landings declined by 45% in the same year compared to the levels in 2011.

In contrast, imports of scallops declined to 42 million lb. in 2011 from about 60 million lb. in 2010, that is, by almost 30% (Figure 34). Because of the increase in the value of scallop exports to over $228 million and of re-exports to $20 million in 2011, and the decline in the value of imports to $268 million, the scallop trade deficit (the difference in the value of exported and imported scallops) reached to its lowest level, $20 million, since 1994 (Figure 38). Therefore, rebuilding of scallops as a result of the management of the scallop fishery benefited the nation by

reducing the scallop trade deficit in addition to increasing the revenue for the scallop fishery as a whole.

However, this trend was sharply reversed in the 2013 fishing year as the value of imports jumped to about $400 million and the value of exports declined to about $147 million. This trend continued in 2014 as well. As a result, scallop deficit increased drastically to over $200 million since 2013 (**Figure 38**).

Figure 34 - Scallop exports and imports (lb.)

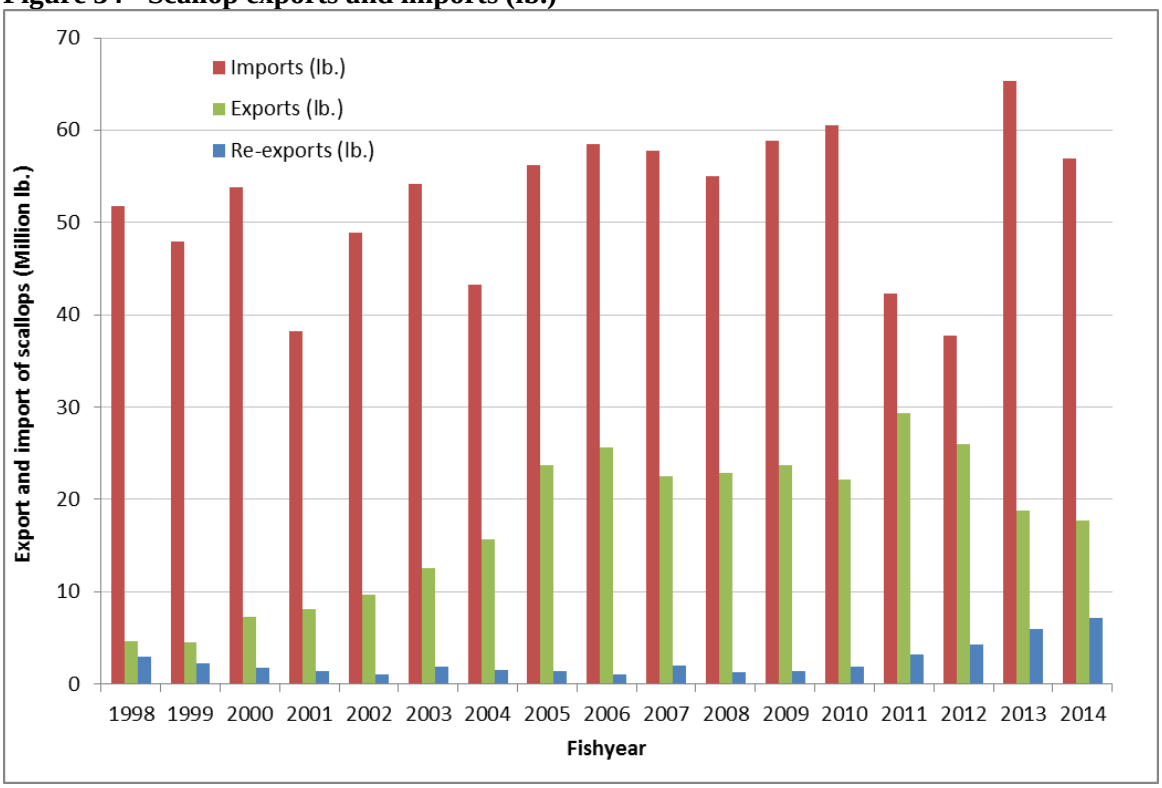


Figure 35 – Average annual price of scallop exports and imports (Million $, in inflation adjusted 2014 prices)

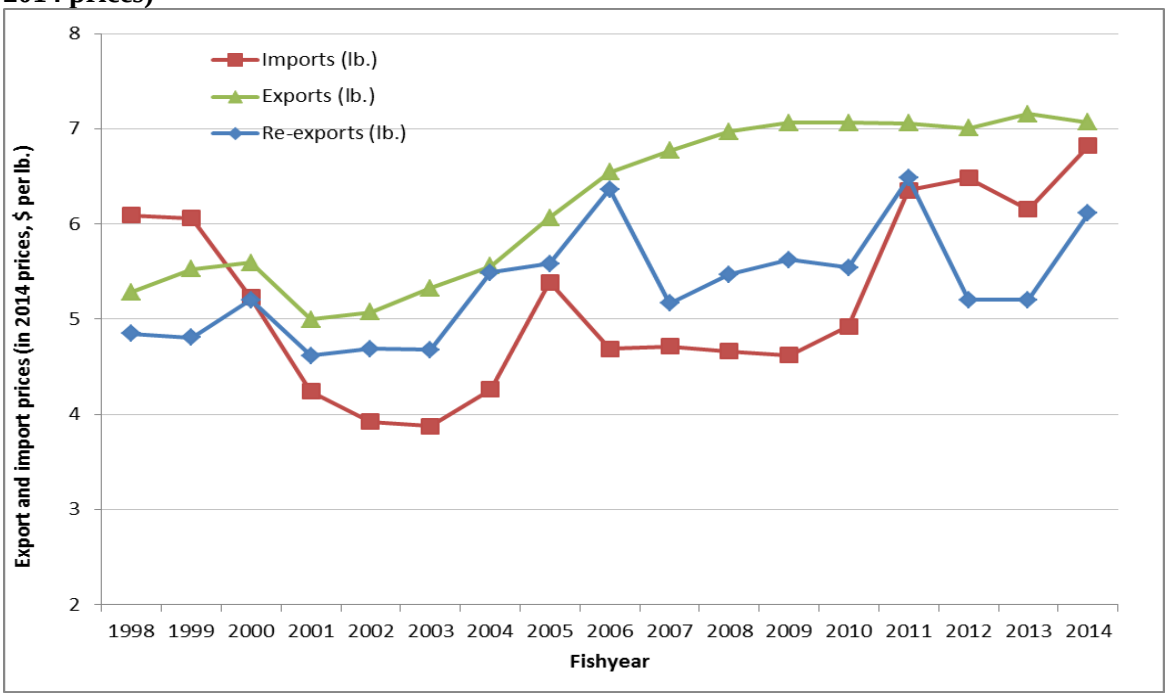


Figure 36 - Percentage composition of landings and ex-vessel price by market size category

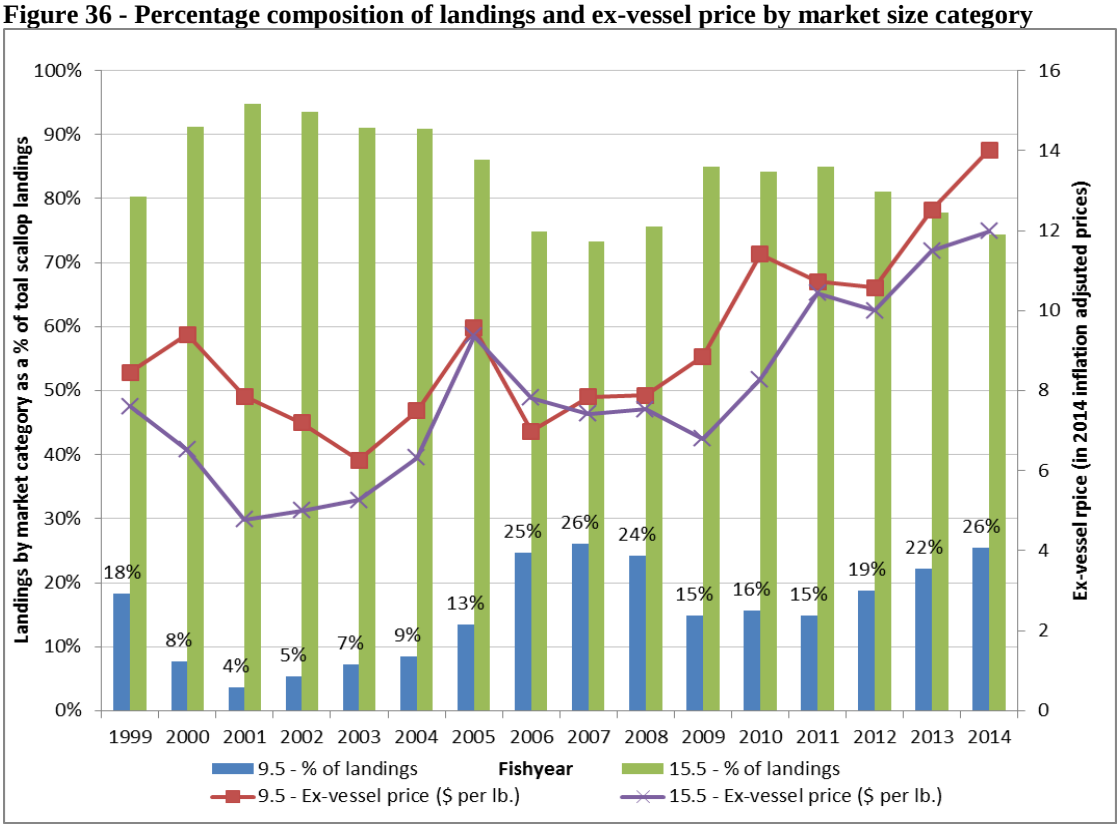


Figure 37 - Value of scallop exports and imports (Million $, in inflation adjusted 2014 prices))

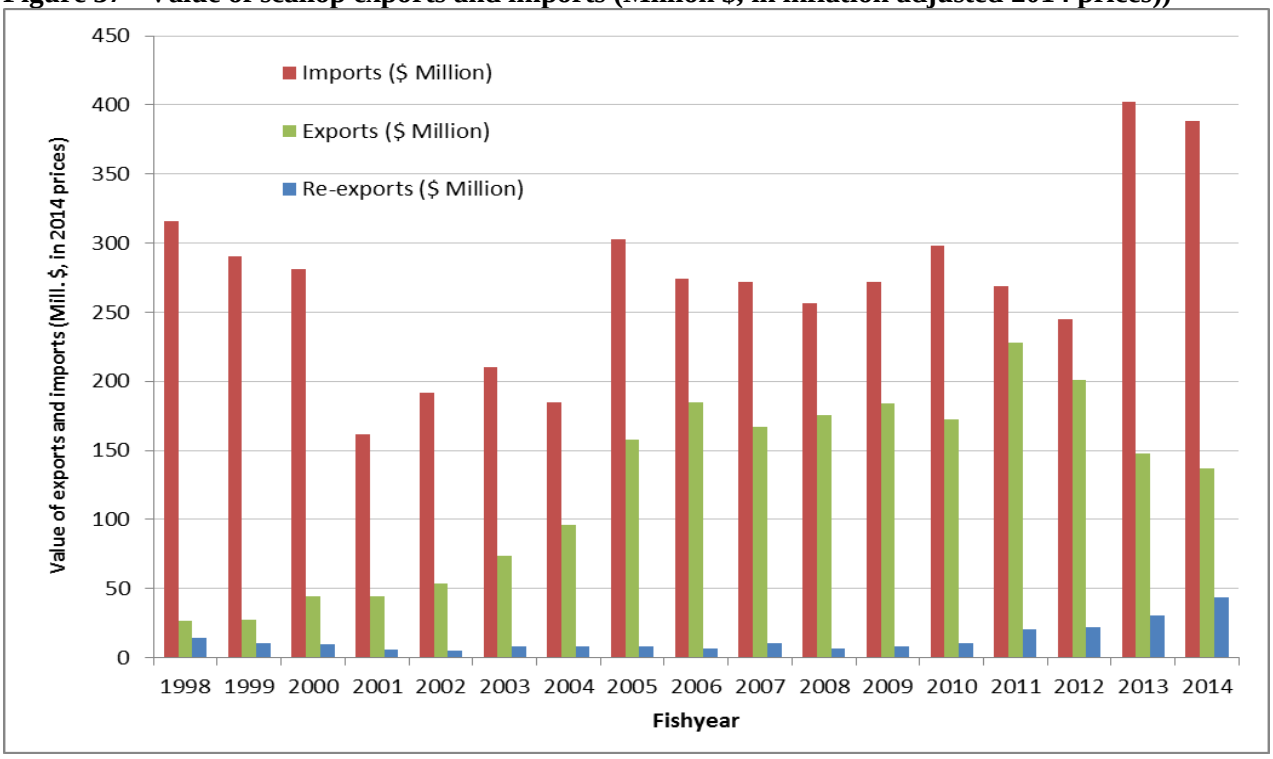
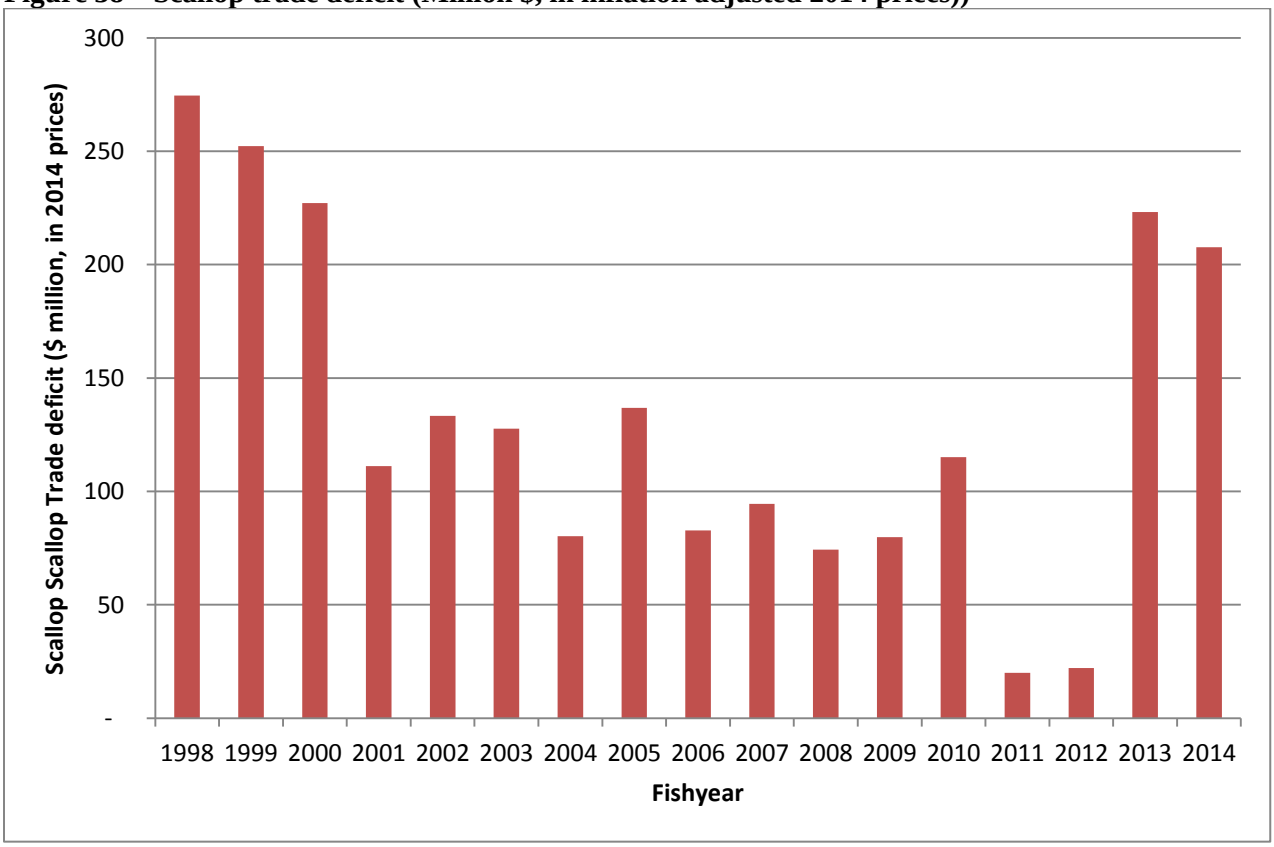


Figure 38 – Scallop trade deficit (Million $, in inflation adjusted 2014 prices))



4.4.11.1 Scallop imports by country

The main substitutes of sea scallops are the imports from China, Peru and Argentina, Japan and Canada (Figure 39). While the scallops imported from Japan and Canada are relatively similar to the domestic product in size and prices, imports from other countries are generally smaller in size and less expensive than the domestic scallops (Figure 40). A proportion of imports are re-exported especially to Canada and Western European countries (Figure 41).

Figure 39 - Scallop imports by country of origin

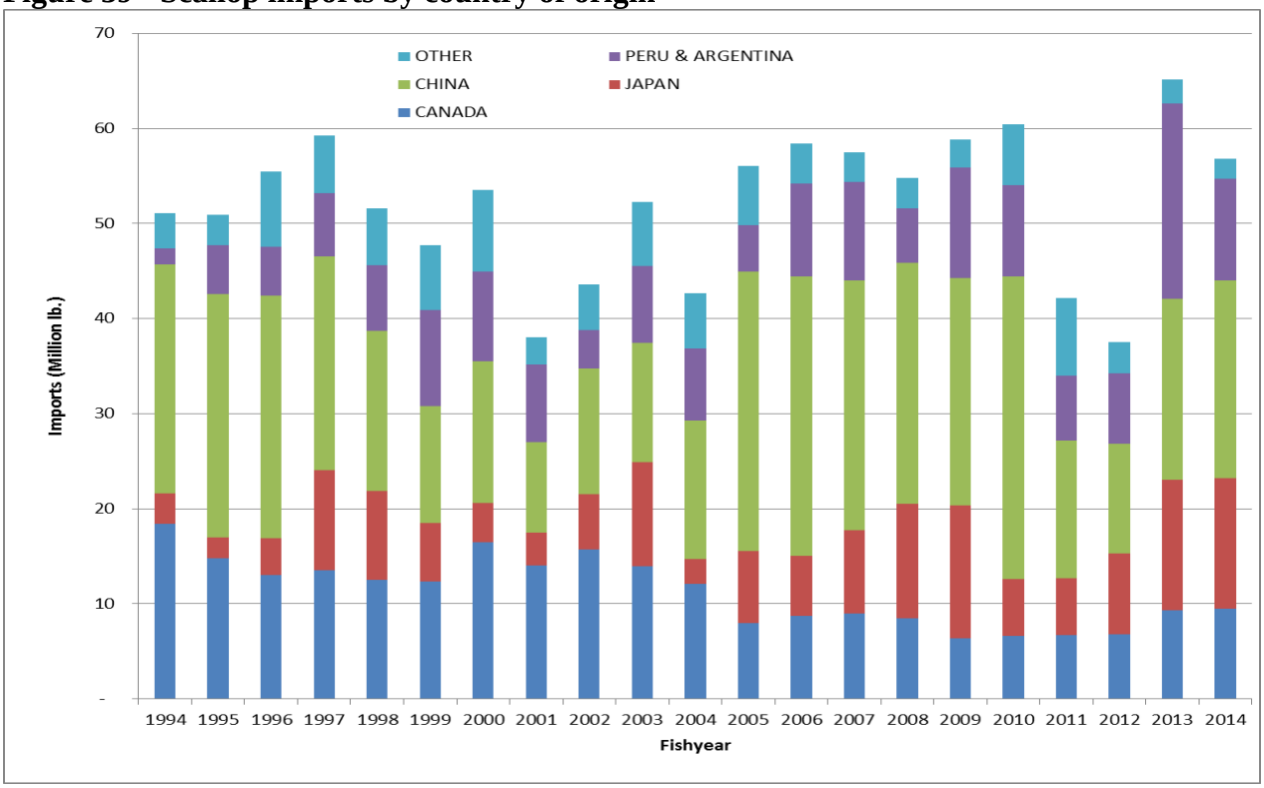


Figure 40 - Scallop import prices by country of origin (in 2014 prices)

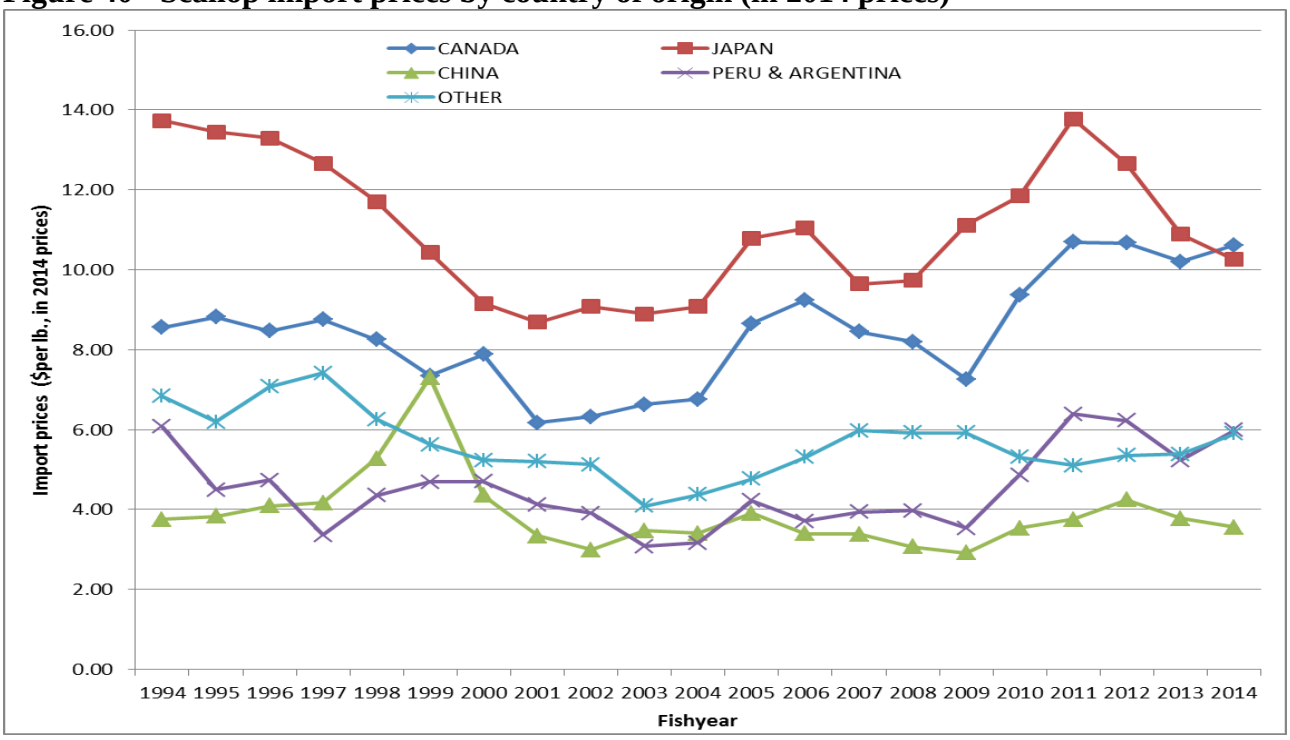
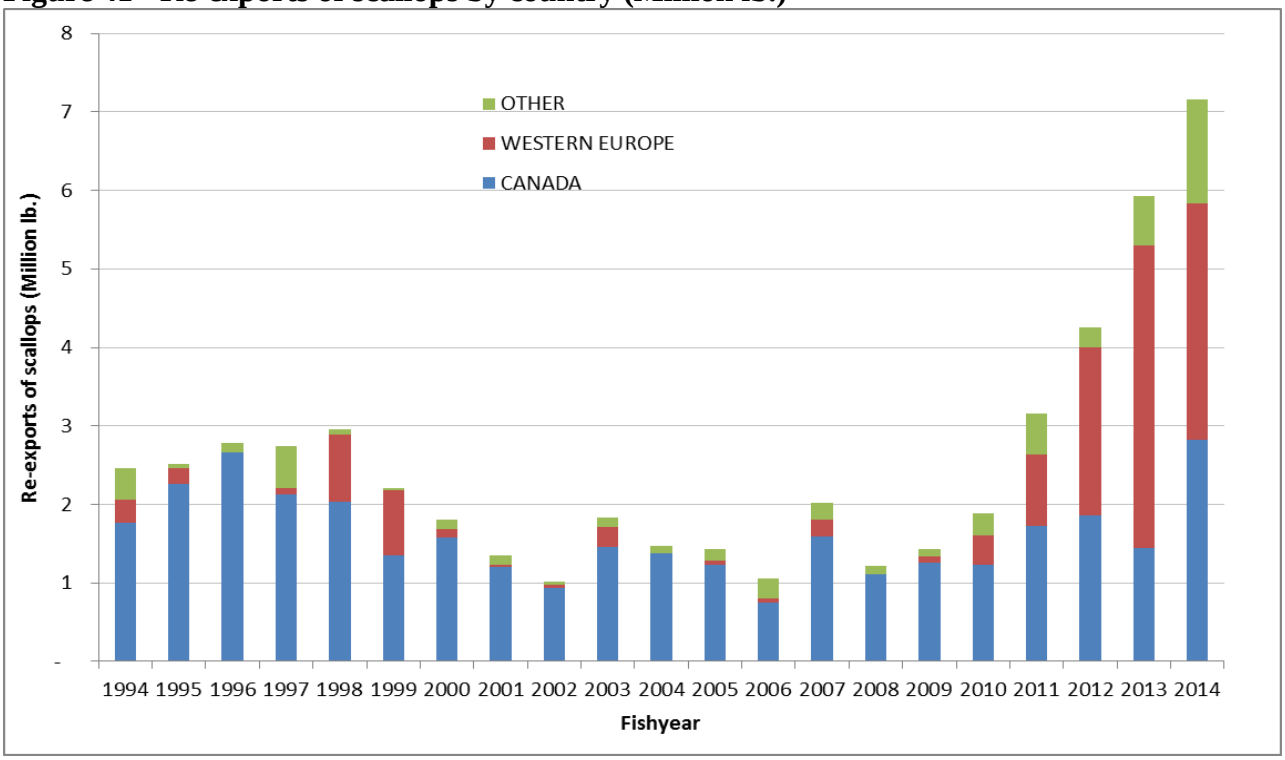


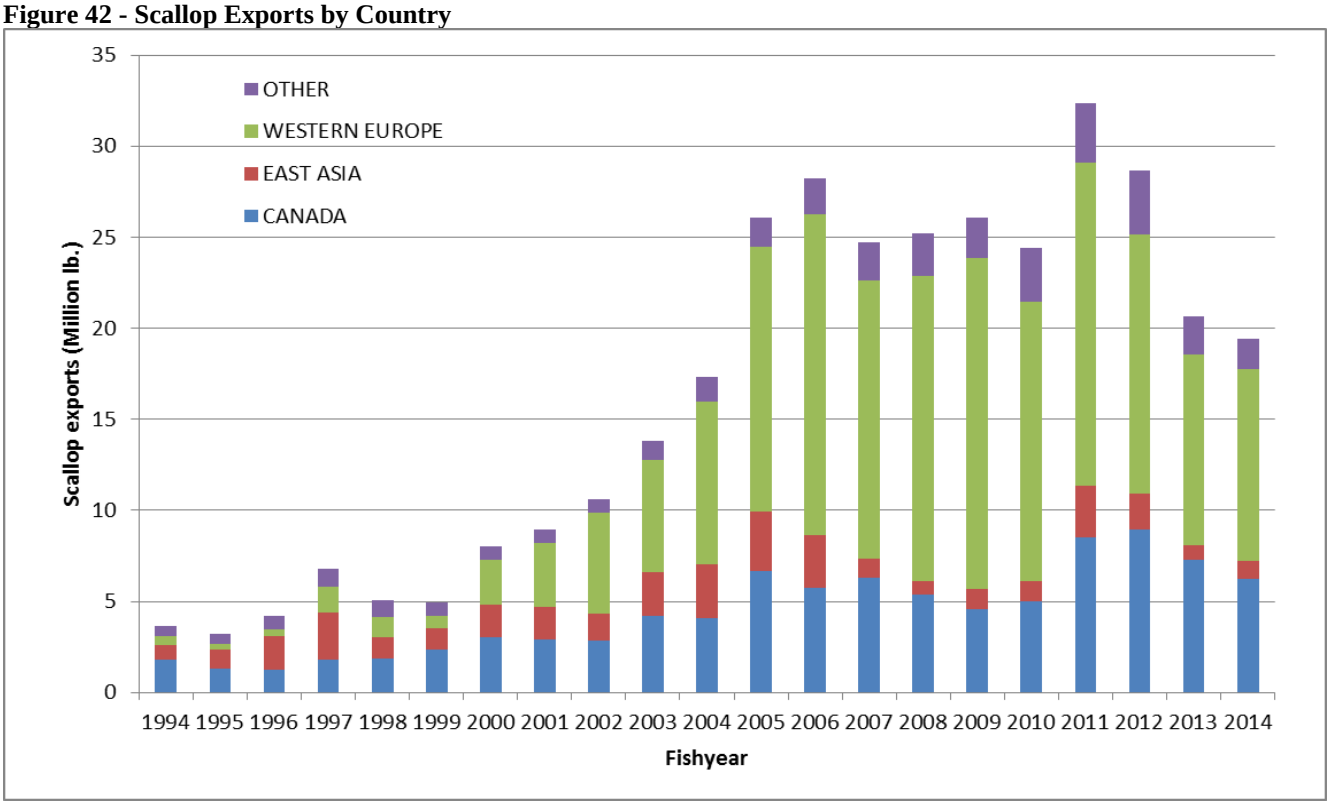
Figure 41 - Re-exports of scallops by country (Million lb.)



4.4.11.2 Scallop exports by country

One of most significant change in the trend for foreign trade for scallops after 1999 was the striking increase in scallop exports. The increase in landings of especially larger sized scallops increased U.S. exports of scallops from about 5 million pounds in 1999 fishing year to a record amount of over 32 million pounds in 2011 fishing year. Western European Countries constituted the largest markets for sea scallop exports (Figure 42).

Figure 42 - Scallop Exports by Country



4.4.12 Northern Gulf of Maine Fishery

Since adoption of the NGOM federal fishery in 2008 total landings from that area have been relatively low. However, landings increased in 2013 and 2014 (Table 60). IN recent years there has been an increase in offshore fishing activity in an area that was fished more historically, Platt's Bank (Figure 43). Scallop fishing in the GOM is traditionally a winter fishery. The state of Maine scallop season is from December – March. As catches increase in federal waters within the NGOM, the risk of the federal TAC being reached and vessels with state permits not being able to fish in state waters is higher. For comparison, the state water landings in both Maine and Massachusetts are much higher than federal water landings (Table 62).

Figure 43 – LAGC fishing activity in the GOM based on VMS data.
Vessel is considered "fishing" if speed between VMS pings is less than 4.5 knots. Pings are binned into a 0.1 nautical mile grid and only locations with 3 or more LAGC vessels are shown. Semi-transparent tan circles are FY2007-2012 combined, and black triangles are March 2013-September 2015. Cluster of black triangles at approximately 43° 7.5' N/69° 35' W represent effort on Platts Bank (over 100 trips, 7 vessels, total landings 18,000 lb. in 2013).

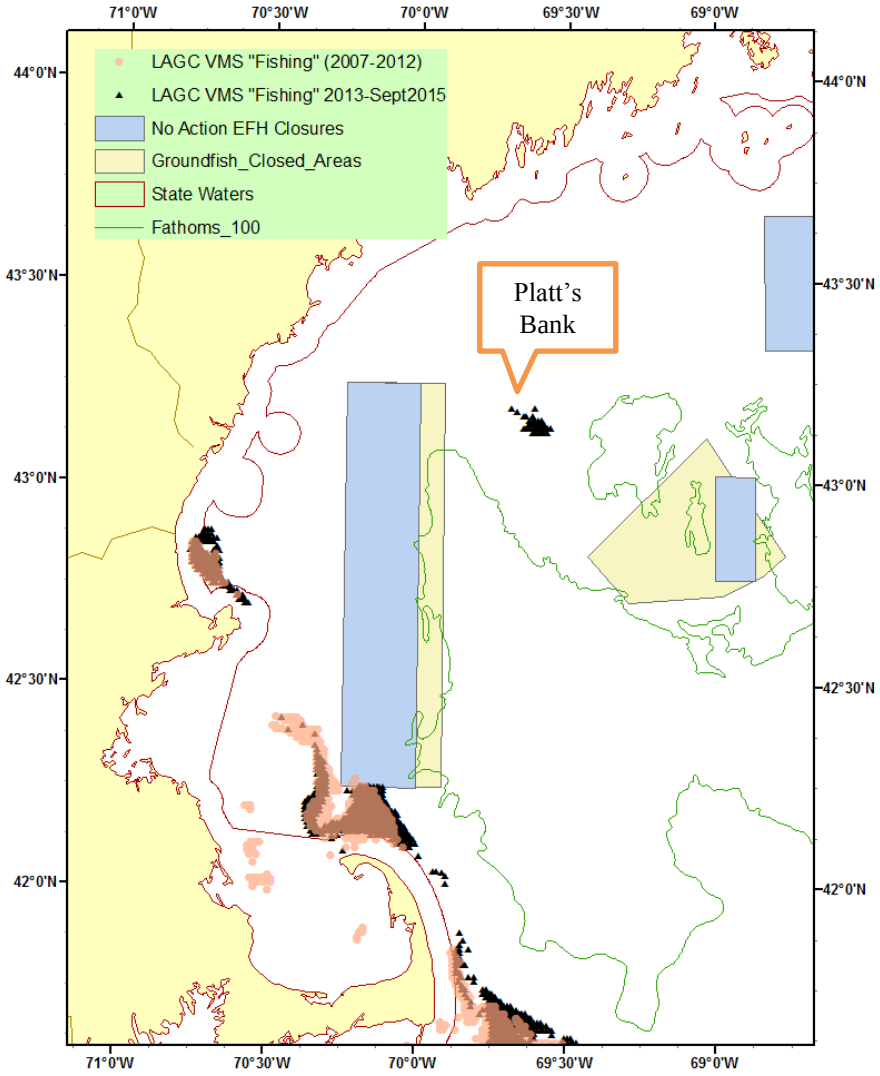


Table 60 – Summary of federal NGOM scallop catch

Year	NGOM landings	% of TAC (70,000 lbs.)
2010	11,539	16.5%
2011	7,946	11.4%
2012	7,733	11.0%
2013	40,663	58.1%
2014	43,015	61.5%
2015 (through 7/22/15)	*18,211*	*26.0%*

Table 61 is a summary of the number of known fishers that have state only permitted vessels that land scallops. All states have been combined, except Maine, the only state with a substantial number of state only permitted vessels. Table 62 is a summary of sea scallop catch from state permitted vessels from state waters in 2008-2013. Most states do not have any reported landings, and some information is confidential because it is from a small number of vessels and/or dealers. Table 63 summarizes state only catch in Maine by month. Total landings have increased dramatically, with most effort in December and January.

Table 61 – Number of known fishers that contribute to state only scallop catch (calendar year 2008-2012) (Source: ACCSP).

	Number of Known Fishers				
	2010	**20102**	**2011**	**2012**	**2013**
ME Dealer Reports	119	222	280	353	401
ME Harvester Reports**	228	250	287	369	364
Other States	30	24	29	26	41

Table 62 - Calendar year scallop landings from state permitted vessel that do <u>not</u> have a federal permit (Source: ACCSP). Small landings from several other states not listed.

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Massachusetts	28,986	167,865	121,416	205,898	132,869	53,873
Maine (Harvester reports)*	87,808	132,769	253,527	234,557	359,444	454,096

**Maine Department of Marine Resources did not have mandatory harvester reporting until December 2008, no not all harvester landings for 2008 are complete for that calendar year.*

Table 63 – Maine state water scallop landings by month

Scallop Meat Pounds by Month (Dealer Data)						
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
January	39,252	3,835	70,884	80,410	41,400	181,329
February	20,765	2,609	44,980	31,883	32,039	32,733
March	11,275	19,114	23,476	15,004	52,759	50,619
December	58,962	52,861	53,018	47,759	124,043	138,450
Total Landings	**136,556**	**79,923**	**193,753**	**175,123**	**251,631**	**424,547**

4.4.16 State water landings

The Scallop FMP also tracks scallop landings from state waters. When Amendment 15 first implemented ACLs, an estimate of state waters landings was 160,000 pounds, based on the most recent year of data available. Since that time effort in state waters has increased. The Scallop PDT has updated the target catch from state waters based on a three year average using data from 2012-2014. Table 64 summarizes recent state water catch from vessels that do not have a federal permit. This catch is outside of the OFL/ACL structure used to manage the federal fishery since it is in state waters not included in the survey or management area. Therefore, this catch does not get deducted from the overall OFL/ACL structure (**Figure 3**). The updated value for state water catch for Framework 27 is 622,312 pounds.

Table 64 – Summary of state water landings from vessels that do NOT have a federal permit

FY	NEW estimated total
2010	1,021,970
2011	593,261
2012	683,463
2013	590,510
2014	592,962
3yr AVG	622,312

4.5 NON-TARGET SPECIES

Non-target species (sometimes referred to as incidental catch or bycatch) include species caught by scallop gear that are both landed and not landed, including small scallops. There are several measures in place that were designed to reduce bycatch including gear modifications, limits on effort, seasonal restrictions etc. In general, rotational area management is designed to improve and maintain high scallop yield, while minimizing impacts on groundfish mortality and other finfish catches. Access programs may even reduce fishing mortality for some finfish species, because the total amount of fishing time in access areas is low compared with fishing time in open areas due to differences in LPUE. Incidental catch is sometimes higher in access areas compared to open areas, but in general total scallop landings is also usually higher in access areas.

Potential non-target species caught incidentally in the scallop fishery were identified in Amendment 15 and previous scallop framework actions based primarily on discard information from the 2009 SBRM report (NEFSC 2009) and various assessments such as GARM III and the Skates Data-poor Workshop. Based on a report presented by NEFSC (2009), the Scallop Plan Development Team identified the following species as having more than 5% of total estimated catch from discards in the scallop fishery: monkfish, skate (overall), and windowpane flounder. The status of these species is listed in Table 65.

Assessment data show that the scallop fishery caught more than 5% of the bycatch (compared to overall catch) for some multispecies stocks by region. Georges Bank (GB) and Southern New England (SNE) yellowtail flounder were caught in amounts greater than 5%, but Cape Cod yellowtail only has occasional spikes over 5%. Although there is greater than 5% caught in both the GB/GOM and SNE/MA regions for windowpane flounder, the catch is generally greater in SNE/MA. The Skate Data-poor Working Group identified the greatest bycatch for the scallop fishery as little and winter skates. See Table 65 for the current status of these species, which has been updated based on assessment results summarized in Groundfish FW53, Skate FW2, and Monkfish FW7.

Table 65: Status of non-target species known to be caught in scallop fishing gear, updated with assessment results through 2014

Species	*Stock*	*Overfished?*	*Overfishing?*
Summer flounder (fluke)	Mid-Atlantic Coast	No	Yes
Monkfish	GOM/Northern GB	No	No
Monkfish	Southern GB/MA	No	No
Northeast Skate Complex	Barndoor skate	No	No
Northeast Skate Complex	Clearnose skate	No	No
Northeast Skate Complex	Little skate	No	No
Northeast Skate Complex	Rosette skate	No	No
Northeast Skate Complex	Smooth skate	No	No
Northeast Skate Complex	Thorny skate	Yes	Yes
Northeast Skate Complex	Winter skate	No	Yes
Multispecies	Windowpane - GOM/GB	Yes	No
Multispecies	Windowpane - SNE/MA	No	No
Multispecies	Winter flounder - GB	Yes	Yes
Multispecies	Winter flounder - GOM	Unknown	No
Multispecies	Winter flounder - SNE/MA	Yes	No
Multispecies	Yellowtail flounder - CC/GOM	Yes	Yes
Multispecies	Yellowtail flounder - GB	Unknown	Unknown
Multispecies	Yellowtail flounder - SNE/MA	Yes	Yes
Atlantic Surfclam	Mid-Atlantic Coast	No	No
Ocean Quahog	Atlantic Coast	No	No

Updates available through NMFS's Status of U.S. Fisheries Quarterly Reports
http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm

4.5.1 Bycatch species with sub-ACL allocations

The only bycatch species with sub-ACLs for the scallop fishery are in the groundfish plan: GB YT, SNE/MA YT, and SNE/MA WP flounder. The tables below describe a summary of multispecies catch from the scallop fishery in fishing years 2015 to date, 2014, and 2013. A complete summary of all catch in the multispecies fishery can be found at: http://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/nemultispecies.html

Total catch of **GB YT** by the scallop fishery in 2015 to date is at about 70% of the sub-ACL allocation for the year (26 mt out of a total 38mt allocation) (Table 66). Almost all of this

bycatch is from scallop effort in open areas, and a small amount from within the access area in CA2 south in March and April from 2014 access area trips that were carried over to the first 60 days of FY2015. In 2014 the scallop fishery exceeded the sub-ACL of GB YT (59 mt of catch compared to a sub-ACL of 51mt – 116.5%) (Table 67). Higher catches were expected in 2014 since the fishery was allocated access in CA2south. More than half of the total 2014 scallop fishery catch of GB YT came from the access area within CA2 (about 37 mt out of a total catch of 59.3 mt). Accountability measures were not implemented because the total ACL for GB YT was not exceeded, and the scallop fishery did not exceed the sub-ACL by more than 50%. In 2013, total catch of GB YT in the scallop fishery was lower than 2014 despite the fact that overall allocations of DAS and CA2 access were at similar levels. Total catch in 2013 was 37.5 mt, about 90% of the 41.5 mt sub-ACL allocated that year (Table 68).

Total catch of **SNE/MA YT** is currently estimated at 19mt, or almost 30% of the total sub-ACL allocation of 66mt (Table 66). A little over 10% of this total catch estimate to date is from LAGC trawl vessels. In 2014 the scallop fishery was also allocated a total sub-ACL of 66mt, and the fishery was estimated to catch almost all of it (63mt or 96% of the sub-ACL) (Table 67). In 2013 the sub-ACL was lower at 43.6 mt, and the scallop fishery exceeded that allocation, 48.6 mt or about 111%. Again, about 10% of the total catch was by LAGC vessels that use trawl gear, but the majority of catch was from LA vessels fishing in open areas in southern New England (about 50% of the total catch), followed by LA vessels in NL (14%). Accountability measures did not trigger for the scallop fishery because the total ACL was not exceeded and the scallop fishery did not exceed the sub-ACL by more than 50%.

Finally, total catch of **SNE/MA windowpane flounder** by the scallop fishery in 2015 to date is relatively low, about 40 mt so far, or about 21% of the sub-ACL (Table 66). The allocation of SNE/MA WP to the scallop fishery has been consistent since 2013 at 183mt per year. In 2014 the fishery caught about 74% of the allocation, and in 2013 about 70% (Table 67 and Table 68). This catch represents about 25% of the total ACL for that species for both years.

Table 66 – 2015 scallop fishery catch to date of GF species with sub-ACL allocations in mt (and pounds). Preliminary data for March-September 29, 2015 only

Stock	Total ACL	Sub-ACL to Scallop fishery	Catch of GF by scallop fishery	Percent of sub-ACL used	Percent of total ACL used by scallop fishery
GB YT	240 (529K)	38 (83,766)	32 (71,022)	84.8%	13.3%
SNE/MA YT	666 (1.47mil)	66 (145,505)	20 (44,386)	30.5%	3.0%
SNE/MA WP	527 (1.16 mil)	183 (403,446)	139 (307,246)	76.2%	26.4%

Table 67 – 2014 year end scallop fishery catch of GF species with sub-ACL allocations (mt).

Stock	Total ACL	Sub-ACL to Scallop fishery	Catch of GF by scallop fishery	Percent of sub-ACL used	Percent of total ACL used by scallop fishery
GB YT	318.1	50.9	59.3	116.4%	18.6%
SNE/MA YT	665	66	64.8	98.2%	9.7%
SNE/MA WP	527	183	140	76.5%	26.6%

Table 68 – 2013 year end scallop fishery catch of GF species with sub-ACL allocations (mt).

Stock	Total ACL	Sub-ACL to Scallop fishery	Catch of GF by scallop fishery	Percent of sub-ACL used	Percent of total ACL used by scallop fishery
GB YT	208.5	41.5	37.5	90.4%	18.0%
SNE/MA YT	665	43.6	48.6	111.5%	7.3%
SNE/MA WP	527	183	129.1	70.5%	24.5%

5.0 ENVIRONMENTAL IMPACTS

5.1 BIOLOGICAL IMPACTS

5.1.1 OVERFISHING LIMIT AND ANNUAL BIOLOGICAL CATCH

The Magnuson-Stevens Act requires that annual catch limits (ACLs) and accountability measures (AMs) be set in all fishery management plans to help control total harvest. Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. The Science and Statistical Committee (SSC) is responsible for setting ABC.

5.1.1.1 Alternative 1 - No Action for OFL and ABC

Under "No Action", the overall OFL and ABC would be equivalent to default 2016 values adopted in Framework 25 (**Table 6**). The No Action ABC including discards is 37,903mt or about 83.5 million pounds. This default amount is lower than the proposed ABC by about 17,834 mt, or about 39 million pounds. The proposed ABC for FY2016 including discards is 55,737 mt or 123 million pounds. This increase is due to very large recruitment on both GB and MA in the last two years. Several fishery allocations are directly based on the ABC, observer set-aside, research set-aside allocation, and the LAGC IFQ sub-ACL. Therefore, all of these allocations for 2016 will increase proportionally based on the higher ABC proposed for FY2016 compared to the No Action ABC, with the exception of the research set-aside, which is a set poundage every year of 267mt, or 1.25 million pounds.

Overall, setting fishery allocations from the No Action ABC would have essentially neutral impacts on the resource because the No Action ABC is only slightly higher than the FY2015 ABC (FY2015 ABC including discards = 31,459mt). There may be potentially low positive impacts on the resource long term if fishery specifications are set based on the No Action ABC compared to the proposed ABC, which is higher. Some of the fishery specifications come directly from the ABC (LAGC IFQ and observer set-asides). So if the ABC is lower, those fishery allocations will be lower as well, having potentially fewer associated impacts on the resource and environment. However, any potentially low negative impacts from setting specifications from a higher ABC are limited because these sources of mortality are relatively minor when compared to the fishery overall. For example, the LAGC IFQ allocation is restricted to 5.5% of the ABC/ACL and the observer set-aside is constrained to 1%. Therefore, there may be some potentially low positive impacts on the resource long term if the No Action ABC is used, but those impacts are limited to a relatively small fraction of overall effort, and in general the best available data should be used to set ABC, which would include updated survey and fishery data used in the proposed ABC compared to older data used in the No Action ABC.

5.1.1.2 Alternative 2 - Updated OFL and ABC for FY2016 and FY2017 (default)

The values approved by the SSC are summarized in **Table 8**. The updated ABC estimate including discards is 55,737 mt or 123 million pounds for FY2016, this is about 17,834 mt, or about 39 million pounds higher than the No Action ABC (default). Updated survey results suggest an increase in biomass, primarily from above average recruitment throughout GB and the MA in 2014 and 2015. The projections for FY2017 suggest an even greater increase than 2016, but the SSC recommends the OFL and ABC remain at 2016 levels based on PDT input.

Since the overall increase in ABC is from scallops that are not exploitable to the fishery, primarily from high abundances of juvenile scallops within closed areas and not exploitable to fishing gear, these increased allocations will need to be fished from areas that are accessible to the fishery. This could potentially increase overall fishing mortality on exploitable scallops available to the fishery.

Overall, these values are based on the most updated information; therefore, there should be positive impacts on the scallop resource from setting fishery limits with updated data. Using older data would keep OFL and ABC lower, which could have positive impacts on the resource by reducing catches, but the plan would not be able to meet requirements to optimize yield and improve yield per recruit if outdated survey and fishery data are used to set catch limits. There may be some negative impacts on portions of the resource from higher allocations based on a higher ABC, but a large proportion of the resource is still protected in closed areas and the majority of the fishery is not allocated access based on the ABC. Instead, the limited access fishery has a limit of 94.5% of the ABC/ACL, but is allocated effort levels at ACT, or an annual catch target that is much lower. Compared to the No Action ABC, the proposed ABC values could have low negative impacts because some fishery allocations that are directly removed from the ABC will be higher, and some of the resource that led to an increase in overall ABC is not accessible to the fishery (juvenile scallops in closed areas). This could potentially increase effort in areas that are accessible, but the majority of scallop fishing effort overall is based on fishing targets well below both the No Action and proposed ABCs. Since fishing targets for the majority of the fishery are set lower than these limits, the plan reduces the risk of overfishing and optimizes overall yield from the fishery long term.

5.1.2 Fishery specifications

5.1.2.1 Summary of biological projections for overall specification alternatives considered in this action

The biological impacts for the allocation alternatives considered in this action are based on results from an updated version of the SAMS (Scallop Area Management Simulator) model. This model has been used to project abundances and landings to aid management decisions since 1999. SAMS is a size-structured model that forecasts scallop populations in a number of areas. The model was updated this year to include a total of 22 areas, including several new areas that are under consideration in this action (expansion of CA2 south, subdividing ETA, and separate access areas within NL). For each alternative 1,000 stochastic runs were completed with the same initial fishery mortality conditions, but various inputs for natural mortality and recruitment were selected for each run. An overall mean of the 1,000 runs is produced for each alternative, as well as percentiles around the mean to help describe the uncertainty of the estimates (i.e. 10^{th} percentile, 25% percentile, etc.). Because natural mortality and future recruitment are relatively uncertain, this has an effect on the projected landings for all scenarios, especially for several years into the future.

It is important to note that this model is based on fishing mortality by area and the inputs are not fishery-based in terms of DAS, etc. The simulation does not model individual vessels or trips; it models the fleet as a whole. The output of the model is then used to eventually compute individual DAS allocations after set-asides, general category landings, etc. are removed. The SAMS model provides projected exploitable biomass estimates, scallop landings, estimates of fishing mortality, average LPUE, DAS used and bottom area swept by area. All of these

projections are described in the following tables and figures. Projections are run out 14 years to provide long-term impacts as required by law. After year two, the model uses the same assumptions for allocations in 2018 and beyond. Therefore, the only difference between the overall performances of alternatives is during the first 2 years.

There are six separate specification alternatives under consideration. In order to assess the potential impacts of the various specification alternatives the PDT developed several additional runs. Specifically, two additional runs were completed to capture the potential impacts of density dependent mortality. Another run was completed to consider the potential impact of highgrading in the Nantucket Lightship access area, if opened by this action. Finally, a status quo of FY2015 run was completed to compare these specifications to current fishing conditions. These additional runs are not actual specification alternatives and were only completed to refine the analyses. A description of all six alternatives is summarized below and the associated allocations are included in **Note:** *This figure updated with corrected boundaries for the NL north area using original coordinates provided in Table 12 of Decision Draft.*

Table 13

FW27 Specification Alternatives

- Alternative 1 (No Action - Default measures from Framework 26)
- Alternative 2 (Base Run - Specifications based on basic run using fishing mortality target principles in the FMP with no modifications to scallop access area boundaries)
- Alternative 3 (Basic run for specifications and additional closure south of CA2 to further protect small scallops)
- Alternative 3a (Basic run for specifications and additional closure south of CA2; CA2 trips shifted to MAAA; and limited access for LAGC vessels only in NL-north) (***Preferred Alternative***)
- Alternative 4 (Basic run for specifications and expanded closure of ETA closed to further protect small scallops)
- Alternative 5 (Basic run for specifications and include limited allocation of effort in northern part of Nantucket Lightship Access Area)

Additional runs completed for analysis purposes only

- Run 2a – Increased density dependence for entire time series (long-term increase)
- Run 2b – Increased density dependence for year one only (short-term increase)
- Run 5b – Assumption of highgrading in NL access area for all u10 landings
- Status Quo Run – FY2015 (31 DAS and 51,000 pounds in AA per FT LA vessel)

5.1.2.1.1 Projected total biomass

Overall the projected biomasses for the various runs are very similar (Figure 44). In 2016 the projected biomass is essentially the same for all runs. In the ST (2016 and 2017) the No Action run has higher biomass because effort levels were so low in 2016. In general, the alternative that extends the ETA closure (Alt 4) has slightly higher ST and LT biomass compared to other alternatives, but overall there is very little difference in total biomass projections between the alternatives. The projected LT biomass estimates for the preferred alternative, Alternative 3a, fall about in the middle of the range of alternatives considered.

It is important to keep in mind that these are mean values, and based on various assumptions for natural mortality and future recruitment, projected landings can vary. Figure 45 shows different percentiles for the 1,000 individual stochastic runs completed for the base run to illustrate the uncertainty associated with these projections.

Figure 44 – Comparison of projected total scallop biomass(mt)

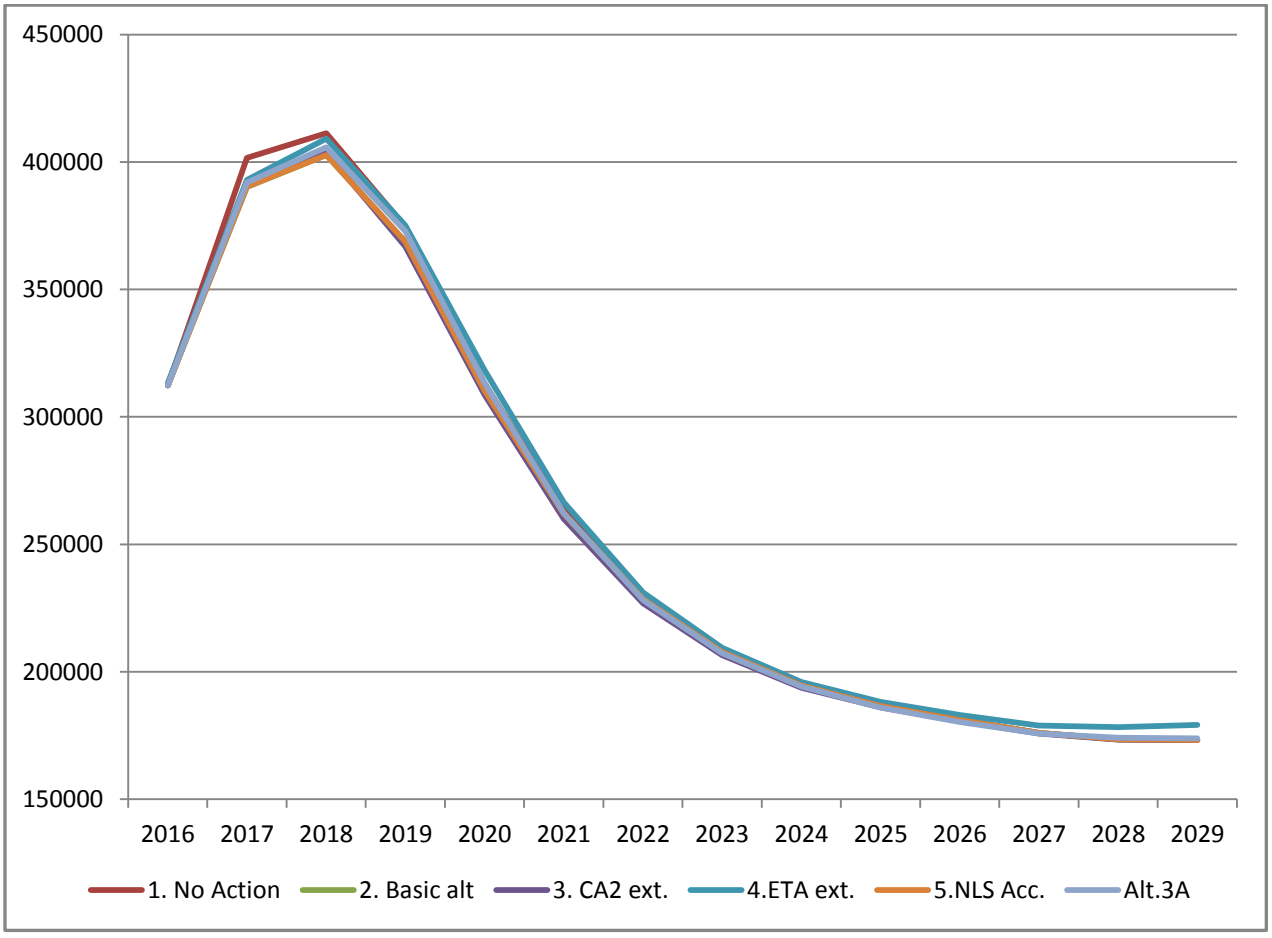
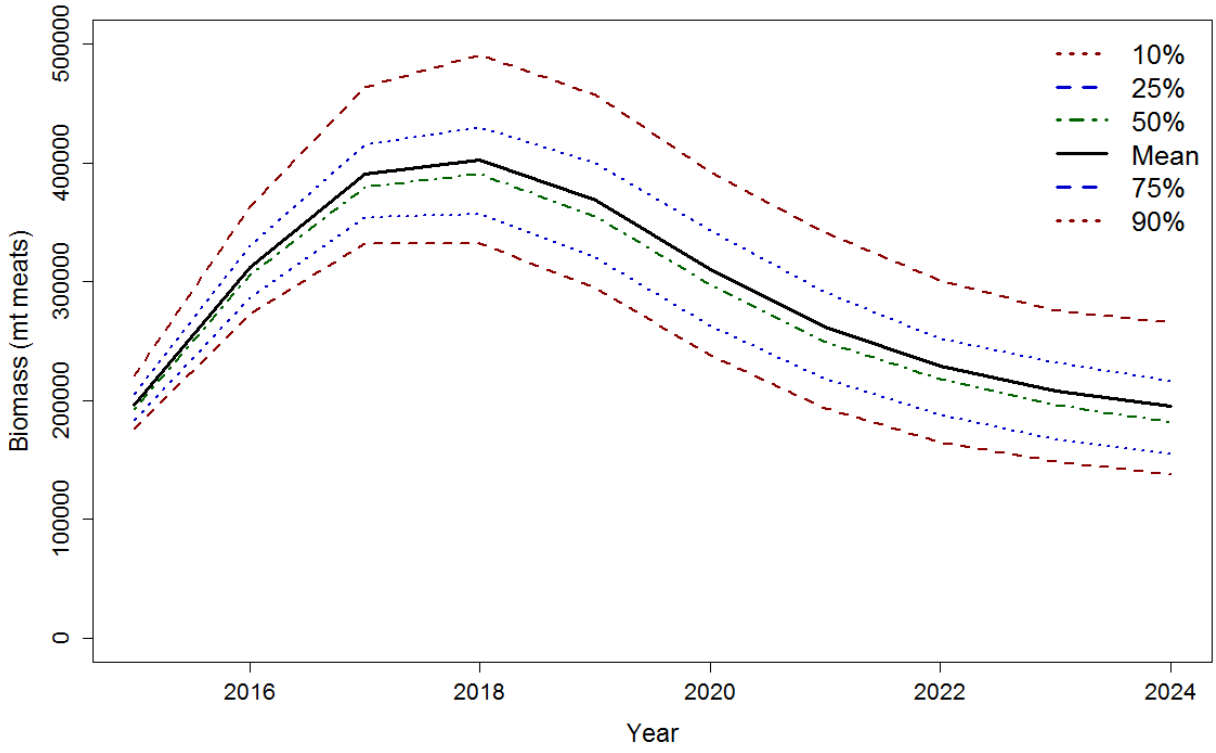


Figure 45 – Comparison of projected total scallop biomass(mt) for the base run (Alternative 2) with percentiles to illustrate the uncertainty associated with the projections



5.1.2.1.2 Current abundance and biomass per area

To get a more detailed idea of the impacts of extending the closure within ETA and closing the area south of CA2, the projected biomass of juvenile and adult scallops per area were summarized as well. Since access is being considered in one portion of NL only, the estimates of juvenile and adult biomass were also calculated for those various subareas to help estimate the impacts/benefits of providing limited access in the northern part of NL only. Table 69 describes the estimated number of juvenile scallops (recruits in millions) as well as the estimated adult biomass (mt of adult biomass) in the current ETA closed area (OLD) compared to the extension ETA closed area (NEW). These are based on 2015 habcam data from Figure 46 and Figure 47.

Table 69 – Estimate of biomass (in numbers for juvenile scallops and biomass for adult scallops) from 2015 Habcam data in ETA

	ET-Close Old Boundary	ET-Close New Boundary
Recruit (# in mill)	7,019	7,898
Total Recruit in ET (# in mill)	9,413	9,413
% Recruit Included in Close Area	75%	84%
Adult (biomass in mt)	7,577	13,516
Total Adult in ET (biomass in mt)	34,608	34,608
% Adult Included in Close Area	22%	39%

Table 70 – Estimate of biomass (in numbers for juvenile scallops and biomass for adult scallops) from 2015 Habcam data in CA2 and NL areas

	CL2-S-EXT	CL2-S-AC	NLS-AC-S	NLS_NA	NLS_EXT	NLS-AC-N
Recruit (# in mill)	551	325	5701	10524	156	46
Adult (biomass in mt)	1026	3796	49	4377	337	1388

Figure 46 - Estimate of biomass from 2015 Habcam survey (color represents biomass larger than 75mm and contours indicate concentrations of smaller scallops, less than 75mm)

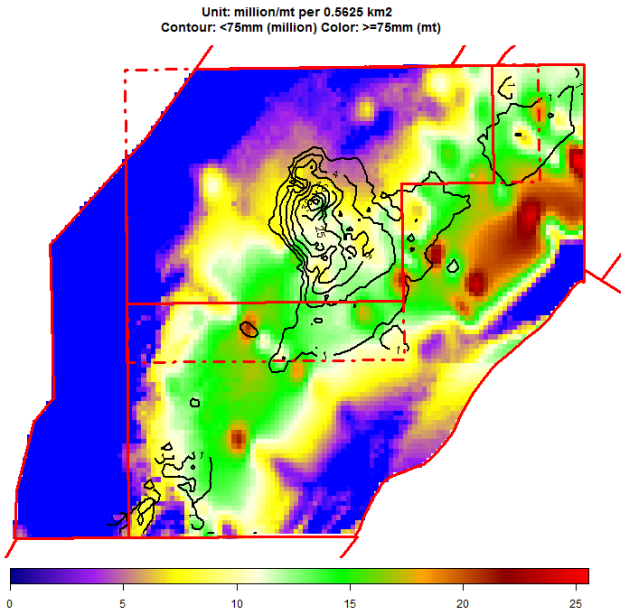
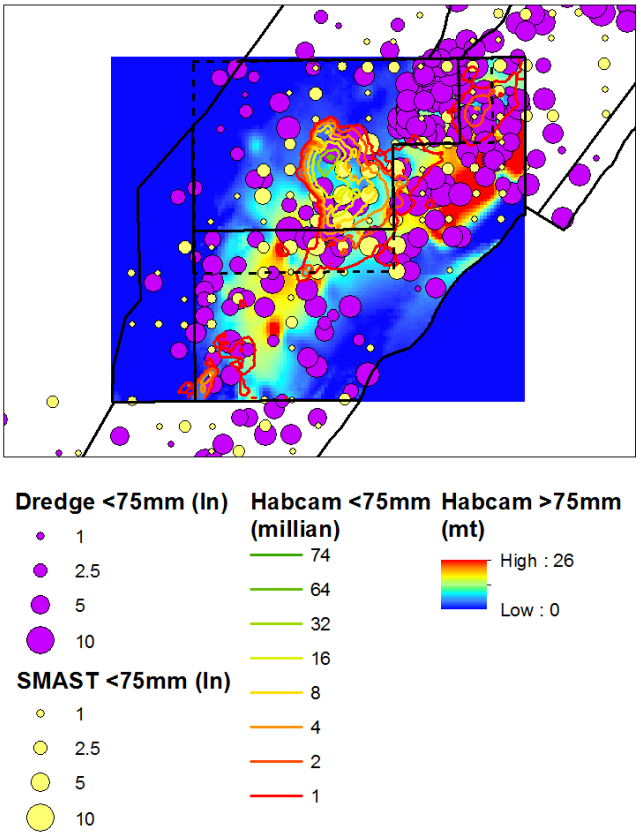


Figure 47 – 2015 Habcam data with abundance of juvenile scallops from VIMS dredge (purple) and SMAST video survey (yellow)



It should be noted that the habcam surveys of MAAA took place during the last 2 weeks of May. Therefore, these estimates are primarily based on the resource in the area before 2015 fishing activity began. The MAAA opened on May 1, 2015, so some fishing took place before the surveys, but the majority took place after. Table 71 and Figure 49 describe the fishing activity within MAAA since the opening and this should be taken into account when considering the estimate of exploitable biomass in the various areas. Specifically, the estimated of adult biomass within ETA extension and ETA open may be overestimates since they do not account for removals that have taken place since the time of the survey in late May. About 20% of the total LA MAAA landings took place in May, so about 50% of the landings to date took place after the survey (June – September) (Table 71). In addition, based on an estimate of the total number of hours vessels fished in MAAA in May-Sept, about 20% of the total hours were spent within the ETA closure extension (Alternative 3)(Figure 48). Figure 49 summarizes the same data for June-Sept only and about 18% of the total MAAA effort (estimated from total hours fished) has been from ETA closed extension area. If that percentage is applied to the landings for June-September that is about 1.5 million pounds (18%* 8.5 million pounds landed by LA vessels in June-Sept).

To date, the LA and LAGC fisheries have concentrated in similar areas within MAAA with a few exceptions; more LA effort has been just east of ETA closed and throughout HC (Figure 50). Percentage wise per fishery, the overall effort within the new ETA extension is similar for both fleets, about 18% of LA effort to date and 22% of LAGC effort, as estimated in total hours vessel speed was less than 4knots.

A subsequent habcam survey of MAAA was conducted in late October 2015. It is too soon for even preliminary biomass estimates to be available from that survey but qualitative input from the researchers suggest that there is still high concentrations of juvenile scallops throughout MAAA. Some of the areas that had very high concentrations in May were not observed at the same levels in October, but these scallops may have simply spread out.

Table 71 – Summary of LA landings in MAAA per month in 2015 to date

Month	Landings	Percent of Total per month
May	3,270,610	19.6%
June	2,870,078	17.2%
July	1,975,061	11.8%
August	1,805,568	10.8%
September	1,883,188	11.3%
Total Allocation to LA fishery	*16,677,000*	*70.8% landed through Sept*

Figure 48 – Estimate of total fishing effort in MAAA compared to ETA closure extension for May-Sept 2015 only (hours "fished" based on vessel speed less than 4knots using VMS data)

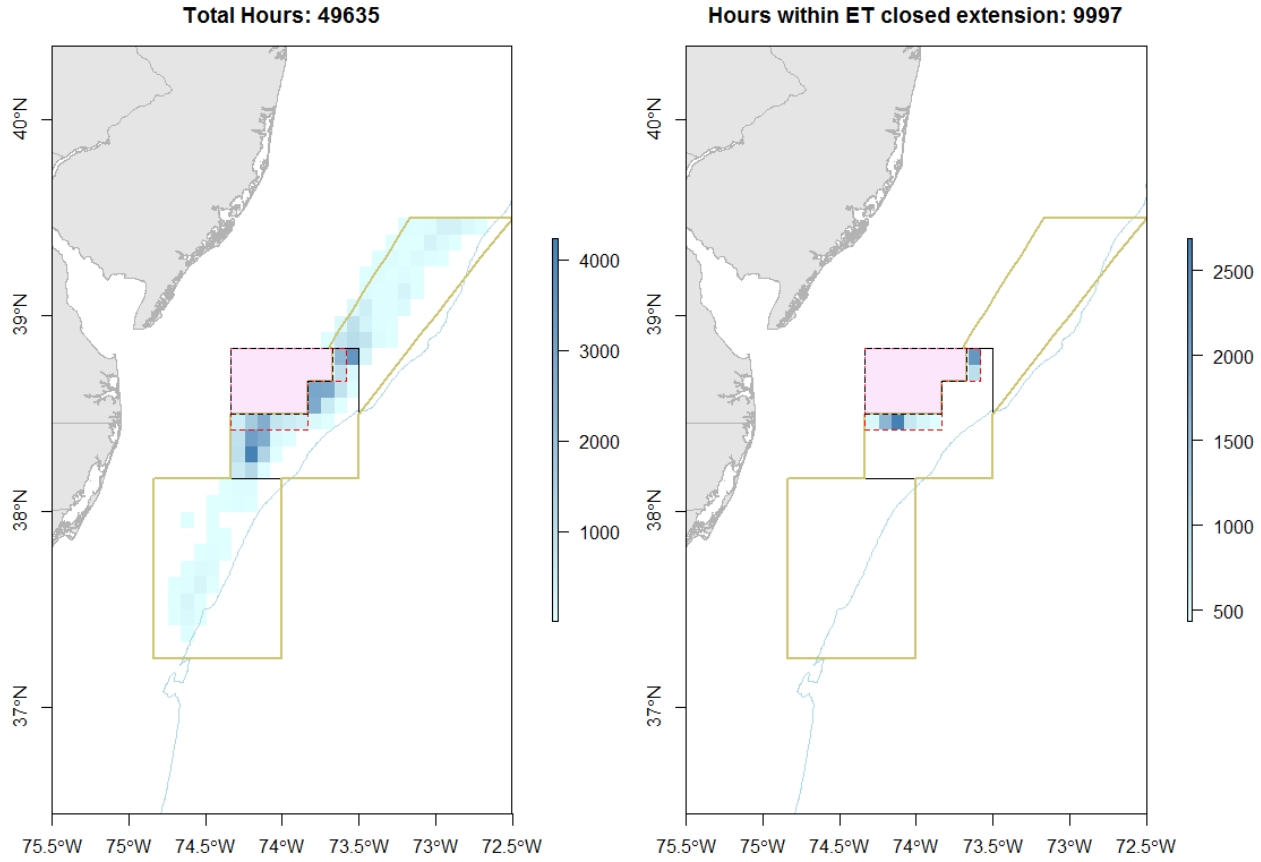


Figure 49 – Estimate of total fishing effort in MAAA compared to ETA closure extension for June-Sept 2015 only (hours "fished" based on vessel speed less than 4knots using VMS data)

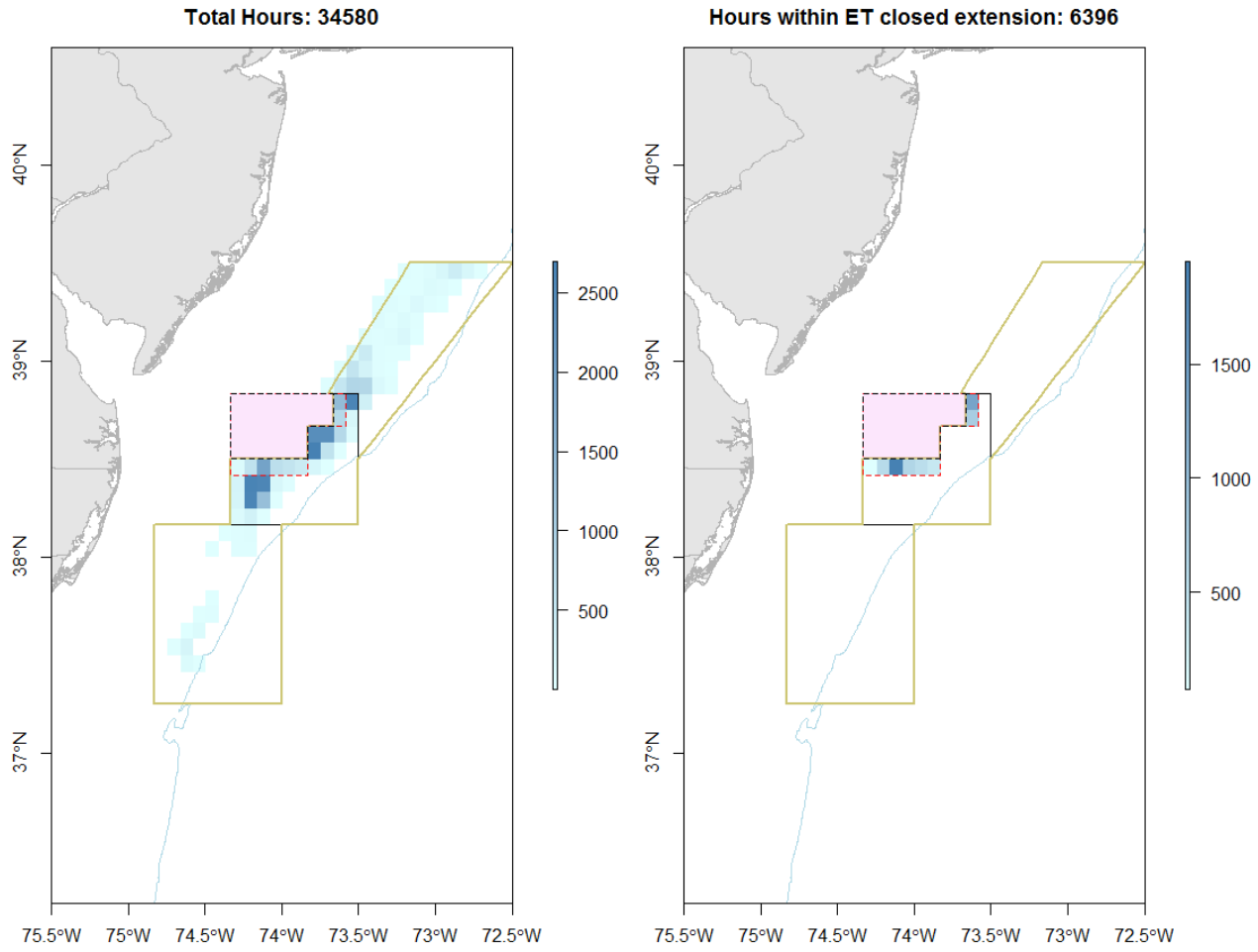


Figure 50 - Estimate of total fishing effort by fishery in MAAA compared to ETA closure extension for May-Sept 2015 only (hours "fished" based on vessel speed less than 4knots using VMS data)

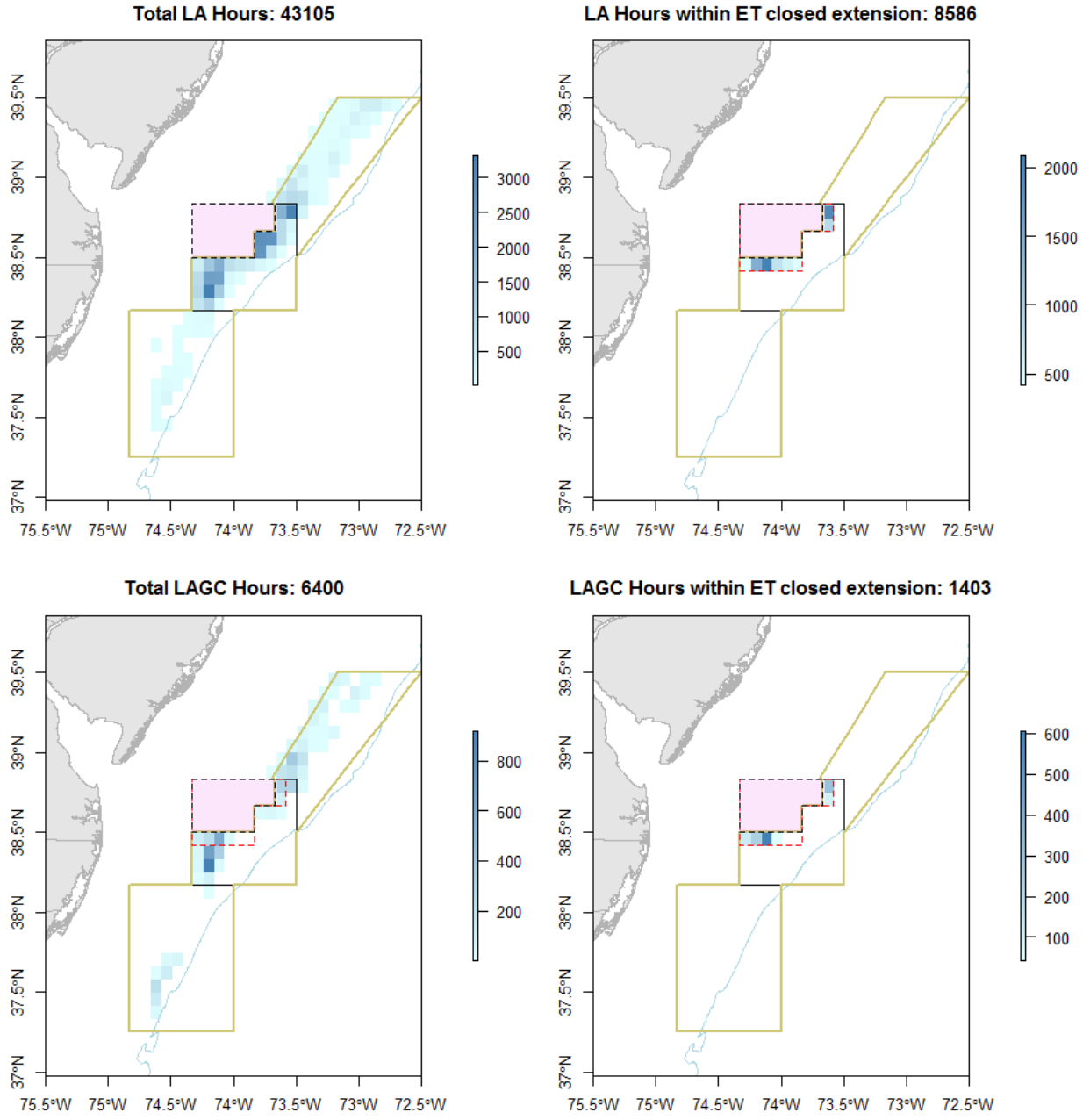


Table 70, Figure 51, and Figure 52 include similar information for CA2 and NL. All estimates are based on habcam survey data of the areas. The breakpoint used for adult scallops was 75mm for ETA, 95mm for CA2, and 100mm for NL; these are all based on the natural break between year classes from shell height frequency dredge data.

Figure 51 – Estimate of biomass from 2015 Habcam survey near CA2 (color represents biomass larger than 95mm and contours indicate concentrations of smaller scallops, less than 95mm).

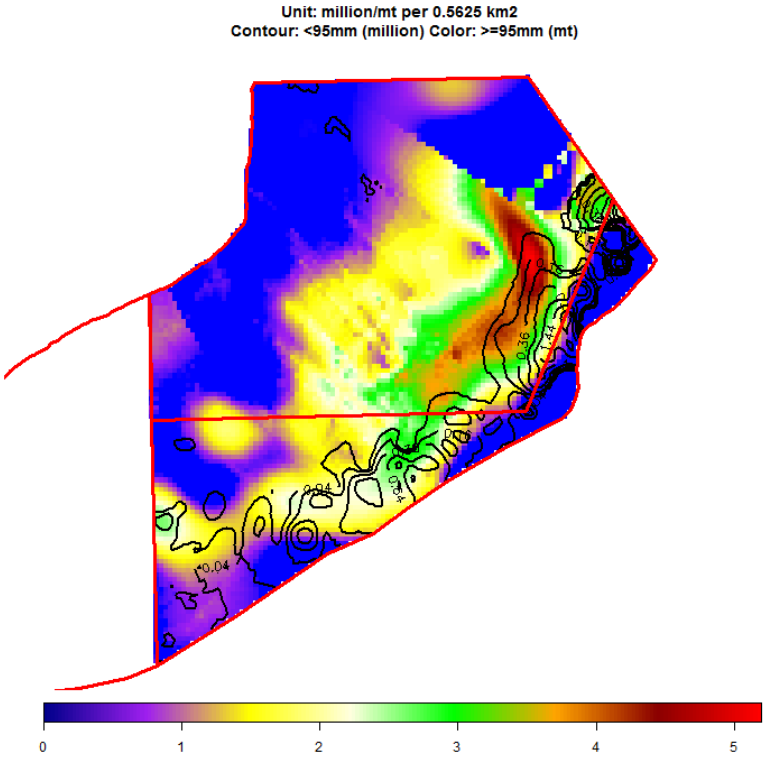
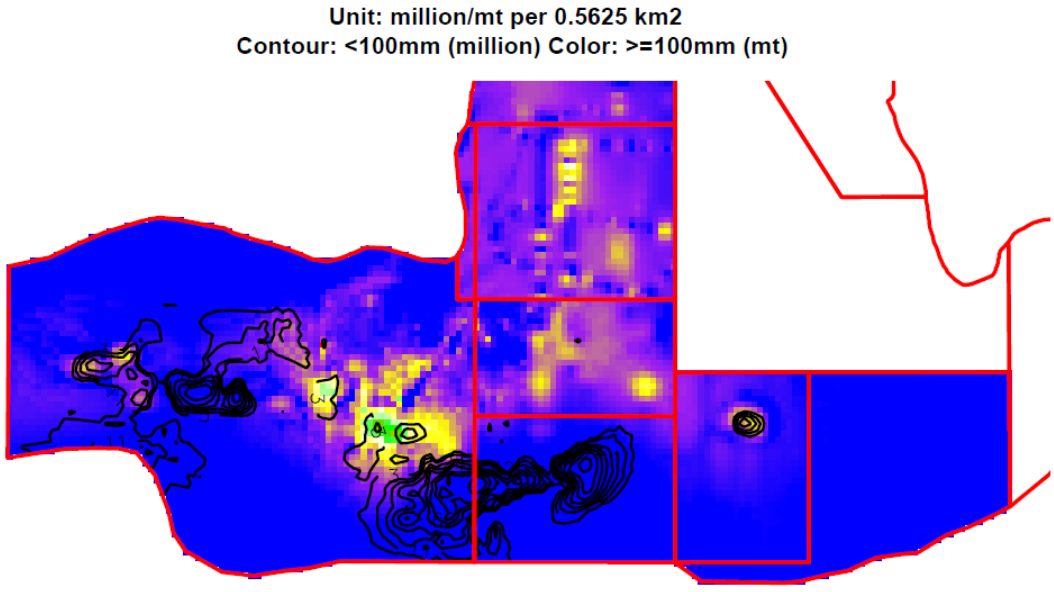


Figure 52 – Estimate of biomass from 2015 Habcam survey near NL (color represents biomass larger than 100mm and contours indicate concentrations of smaller scallops, less than 100mm).



5.1.2.1.3 Projected landings

Overall the projected landings for the various runs are very similar (Table 72 and Figure 53). In 2016 the projected landings for Alternatives 2, 4 and 5 are identical, about 48.5 million pounds. Alternative 3 and 3a include a closure south of CA2, so the total projected landings are lower from fewer DAS (46.9 million pounds total or about 1.6 million pounds less due to the new closure that is equivalent to about 1.8 DAS per FT LA vessel). No Action projected landings in 2016 are lower, by about 18 million pounds because it only includes default measures which are reduced allocations (about 26 DAS and 1 access area trip). For the 2016 and 2017 period Alternative 4 has lower landings than the other alternatives (about 4 million pounds over 2 years), excluding No Action which is much lower than all the runs. But in the long term Alternative 4 is expected to provide higher landings overall from increased yield of small scallops within the extension area of ETA closed. The rest of the alternatives, including the Preferred Alternative, have similar long-term landings.

It is important to keep in mind that these are mean values, and based on various assumptions for natural mortality and future recruitment, projected landings can vary. Figure 54 shows different percentiles for the 1,000 individual stochastic runs completed for the base run. The uncertainty in projected landings is lower for year 1, but increases quite a bit for 2018 and beyond.

Table 72 – Projected total landings for each FW27 Alternative (in million pounds)

FY	1. No Action	2. Basic alt	3. CA2 ext.	4.ETA ext.	5.NLS Acc.	***Alt.3A (Pref)***
2016	30.6	48.5	46.9	48.6	48.5	46.9
2017	87.9	82.9	84.1	78.3	83.1	81.5
2018	118.1	114.1	118.7	115.6	114.2	112.6
2019	135.7	131.9	131.3	131.8	131.9	132.7
2020	116.4	114.8	115.9	121.2	114.9	118.1
2021	95.5	94.8	94.5	99.1	94.8	95.4
2022	77.9	77.6	77.1	80.4	77.6	77.5
2023	68.2	68.0	67.5	69.8	68.0	67.9
2024	63.1	63.0	62.5	64.6	63.0	63.1
2025	61.2	61.1	60.8	62.8	61.1	61.3
2026	61.6	61.6	61.4	62.7	61.6	60.8
2027	62.0	62.0	61.9	62.9	62.0	60.7
2028	60.8	60.9	60.8	63.6	60.9	61.0
2029	64.9	65.0	64.9	65.8	65.0	62.6

Figure 53 – Comparison of projected total scallop landings (million pounds)

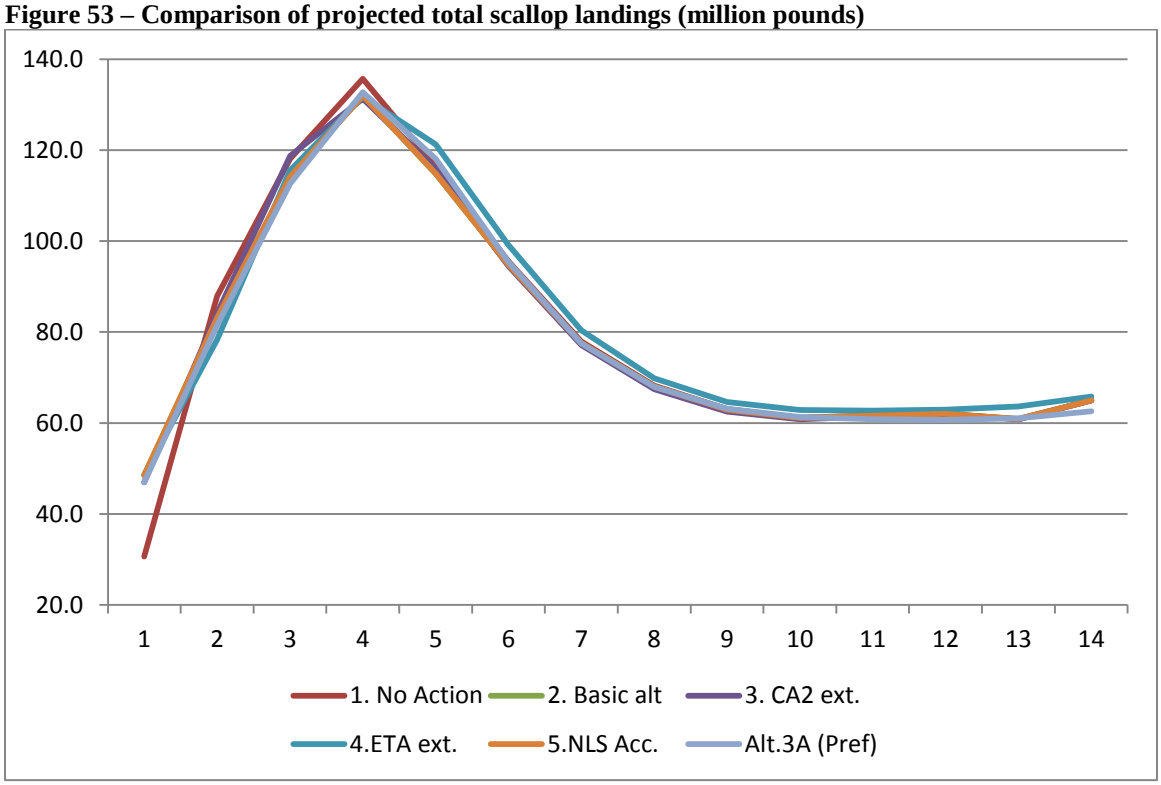
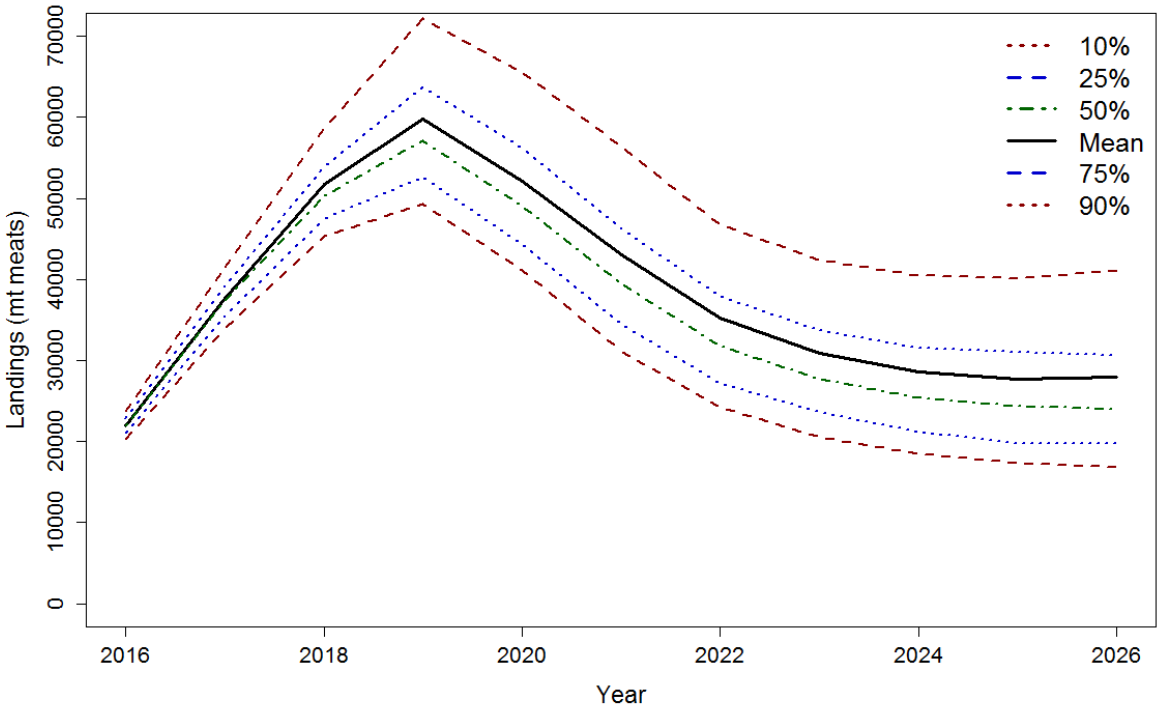


Figure 54 – Comparison of projected total scallop landings for base run (Alternative 2) (mt)



5.1.2.1.4 Fishing mortality

- All the alternatives under consideration have a total estimate of fishing mortality considerably lower than the limit used for setting fishery allocations for the fishery overall. The ACT, or annual catch target includes on overall fishing limit of 0.34 for the total fishery. The range of total fishing mortality under consideration is between 0.06 (No Action) and 0.12 for Alternative 4.
- Because there is currently a relatively large amount of total biomass within EFH, GF closed areas, as well as very high abundances of juvenile scallops in MA closed areas, GB closed areas, and open areas, much of the total biomass is small and not accessible to the fishery. Therefore, the overall F rates are projected to be very low for the fishery.
- The total fishing mortality is constrained by the fishing target principle that does not enable fishing effort to increase above Fmsy in open areas (0.48). When open area fishing mortality is set at this maximum, combined with effort in access areas that is higher to optimize yield in those areas, and zero fishing mortality on scallop in closures the overall fishing mortality projections are relatively low.
- Therefore, the risk of overfishing is relatively low for all of the alternatives under consideration since the projected F rates are well below 0.34. However, the model tends to underestimate fishing mortality. In recent years when the Scallop PDT has evaluated the projected F rate compared with the actual F rate the following year, total F has been underestimated by 20-30% in some years.

Table 73 – Projected overall F for alternatives under consideration

subperiod	Fishing year	1. No Action	2. Basic alt	3. CA2 ext.	4.ETA ext.	5.NLS Acc.	Alt.3A
2016-2017	2016	0.06	0.11	0.10	0.12	0.11	0.11
	2017	0.16	0.16	0.16	0.15	0.16	0.15
2016-2017 Total		**0.11**	**0.14**	**0.13**	**0.14**	**0.14**	**0.13**
2018-2020	2018	0.21	0.21	0.23	0.21	0.21	0.21
	2019	0.26	0.26	0.30	0.26	0.26	0.26
	2020	0.33	0.33	0.31	0.34	0.33	0.34
2018-2020 Total		**0.27**	**0.27**	**0.28**	**0.27**	**0.27**	**0.27**
2021-2029	2021	0.33	0.33	0.32	0.32	0.33	0.33
	2022	0.31	0.31	0.30	0.30	0.31	0.31
	2023	0.30	0.30	0.29	0.29	0.30	0.30
	2024	0.29	0.29	0.29	0.29	0.29	0.29
	2025	0.29	0.29	0.29	0.29	0.29	0.29
	2026	0.30	0.30	0.30	0.30	0.30	0.30
	2027	0.31	0.31	0.31	0.30	0.31	0.30
	2028	0.31	0.31	0.31	0.31	0.31	0.31
	2029	0.33	0.33	0.33	0.31	0.33	0.31
2021-2029 Total		**0.31**	**0.31**	**0.30**	**0.30**	**0.31**	**0.30**
Grand Total		**0.27**	**0.27**	**0.27**	**0.27**	**0.27**	**0.27**

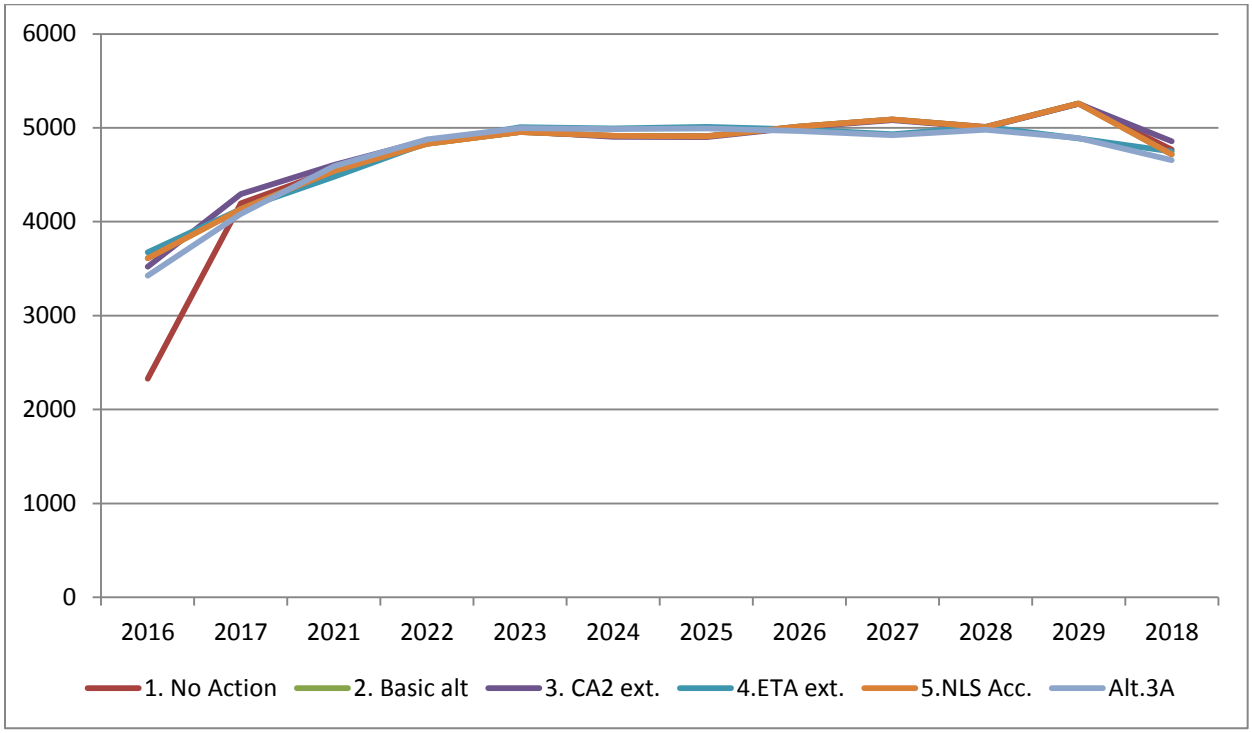
5.1.2.1.5 Projected bottom area swept

- Area swept is an indicator of the level of fishing associated with each alternative; higher area swept values represent higher potential impacts on the resource and associated impacts.
- Overall, all the alternatives have similar total area swept estimates, about 3,400 - 3,600 square nautical miles in 2016 and very similar for the first 2 years combined (Table 74 and Figure 55).
- No Action (Alternative 1) has the lowest estimate of area swept for 2016 since it does not include a full year of fishery allocations, default measures only. After that Alternative 3a, the preferred alternative has the lowest projected area swept in 2016 since it has lower DAS and catch rates are projected to be slightly higher in MAAA compared to CA2, so when those trips are shifted to MAAA the total projected DAS is slightly lower.
- Alternative 3 with a new closure south of CA2 has slightly lower area swept in 2016, but that increases in 2017 compared to the other alternatives. In the LT the runs have about the same area swept, but Alternative 4 provides more landings for about the same total area swept.

Table 74 – Projected area swept for alternatives under consideration

subperiod	Fishing year	1. No Action	2. Basic alt	3. CA2 ext.	4.ETA ext.	5.NLS Acc.	Alt.3A
2016-2017	2016	2329	3614	3521	3675	3609	3426
	2017	4195	4133	4296	4134	4133	4083
2016-2017 Total		**6524**	**7747**	**7817**	**7809**	**7742**	**7509**
2021-2029	2021	4553	4540	4605	4477	4540	4590
	2022	4833	4828	4867	4839	4828	4876
	2023	4957	4954	4961	5005	4955	4996
	2024	4916	4914	4906	4994	4914	4985
	2025	4910	4908	4900	5009	4909	4994
	2026	5014	5012	5006	4984	5013	4966
	2027	5090	5089	5083	4932	5089	4923
	2028	5009	5008	5004	5010	5008	4981
	2029	5259	5258	5255	4887	5258	4892
2021-2029 Total		**44541**	**44511**	**44587**	**44137**	**44514**	**44203**
2018-2020	2018	4767	4718	4858	4748	4718	4656
	2019	9813	9549	9134	8810	9549	10603
	2020	5632	5599	5756	6571	5597	5650
2018-2020 Total		**20212**	**19866**	**19748**	**20129**	**19864**	**20909**
Grand Total		**71277**	**72124**	**72152**	**72075**	**72120**	**72621**

Figure 55 – Comparison of projected area swept



5.1.2.1.6 Projected size frequency per area

The Scallop PDT has completed projections of shell height frequencies per area for the next several years to evaluate the potential composition of scallops in each area based on 2015 survey results and estimated growth, fishing mortality, and natural mortality. This section includes a subset of the areas to illustrate the potential size composition of scallops for different areas. The black line in the following figures is the size and frequency of scallops measured in the 2015 survey season, the blue line is the projected size and frequency of those scallops for May 2016, and finally the red line is the projected size and frequency of the same scallops for May 2017. These estimates assumed fishing effort based on Specification Alternative 2, the basic run.

In general the majority of scallops in open areas in both GB and MA are projected to be in the 100-120mm range with some larger and smaller. The South Channel area is provided as an example of open areas on GB (Figure 56), and the New York Bight area is shown in Figure 57. There seem to be two distinct year classes in NYB based on 2015 survey results, one with a mean of 55mm and another with a mean of 80-100mm. The larger scallops are projected to be about 110mm in May 2016. Note that these areas are not projected to have very high densities (mean number of 110mm scallops per survey tow is about 15 scallops per area).

Figure 58 shows the size frequencies for the northern part of NL, which is proposed to be open to limited effort by LAGC vessels only (Section 2.2.3). Most scallops were about 80-90 mm in the 2015 survey and those scallops are projected to be about 110 mm in May 2016, with some a bit larger. In 2017 most scallops in that area are projected to be 120+mm. The overall size distribution and density of scallops projected to be in NL-north is larger compared to open areas

nearby in the Channel. To compare these distributions with areas that will remain closed to the fishery, Figure 59 shows the size distributions for scallops within the proposed closure n ETA. This area is primarily filled with small scallops, mean of 50mm from the 2015 survey of that area. There are some larger scallops at 90mm and 120mm, but at much lower densities. Some of those larger scallops will be exploitable to fishing gear in 2016, but the vast majority of scallops in that area are projected to be only 80-90mm, not optimal for harvest yet.

Figure 56 – Projected shell height frequencies for the South Channel SAMS area in GB

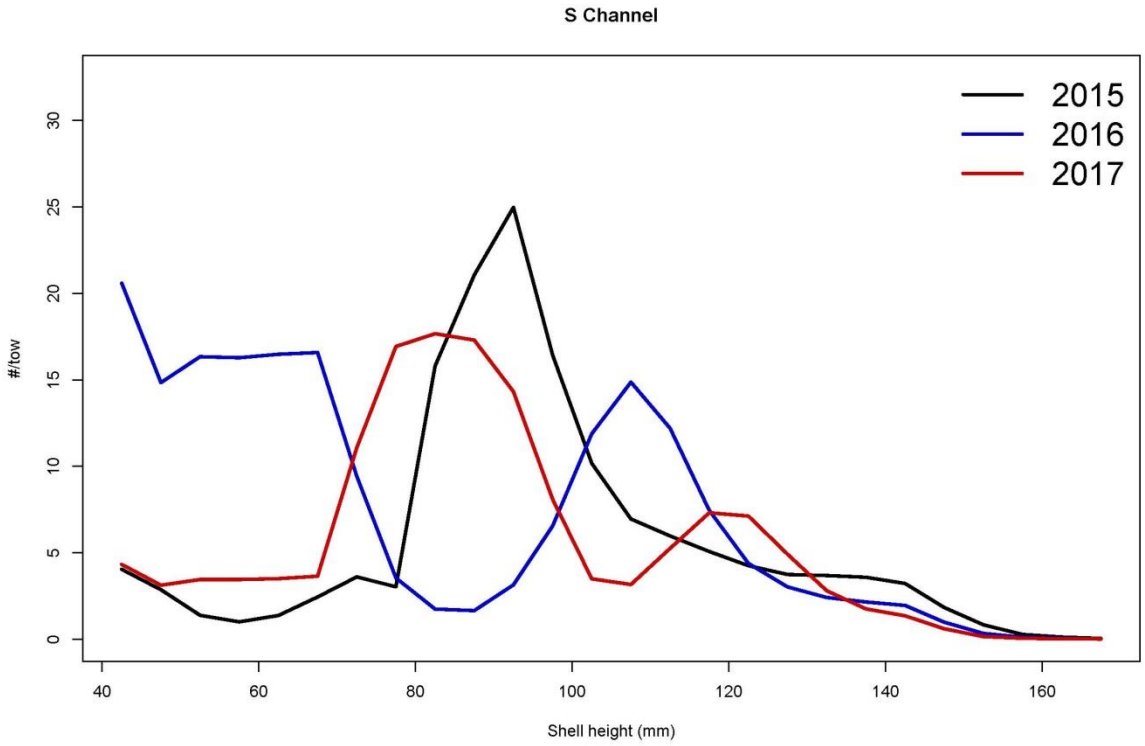


Figure 57 – Projected shell height frequencies for the New York Bight SAMS area in MA

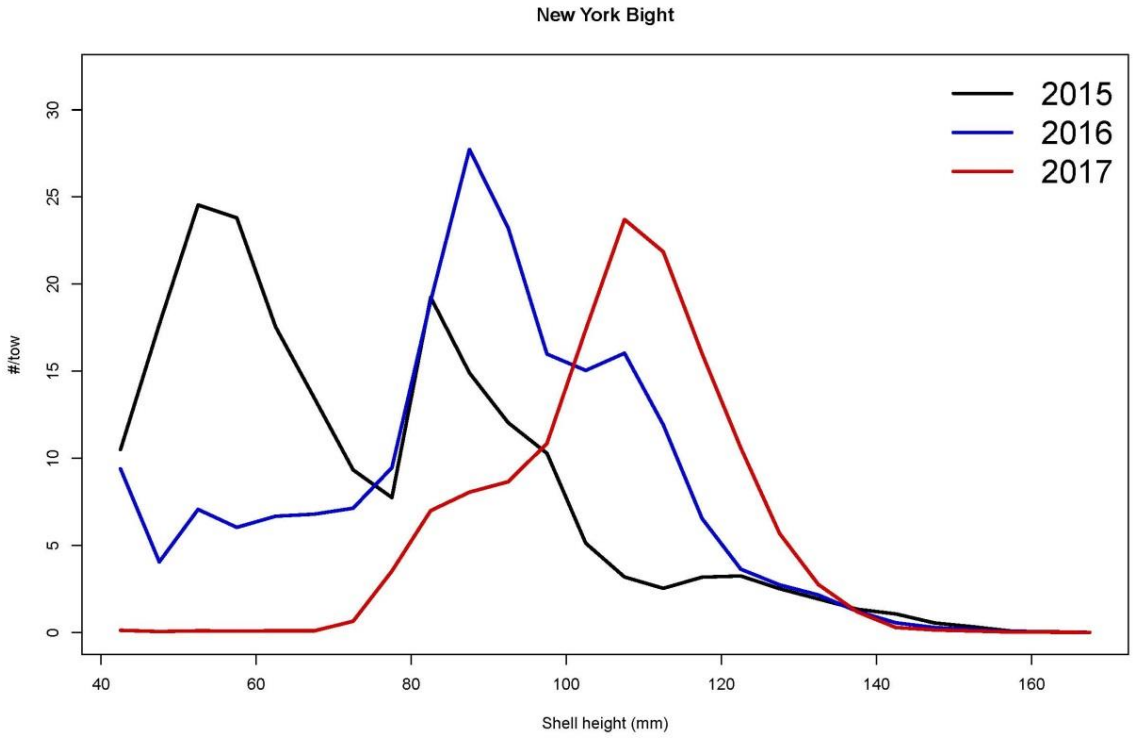


Figure 58 – Projected shell height frequencies for the proposed access area in NL-north

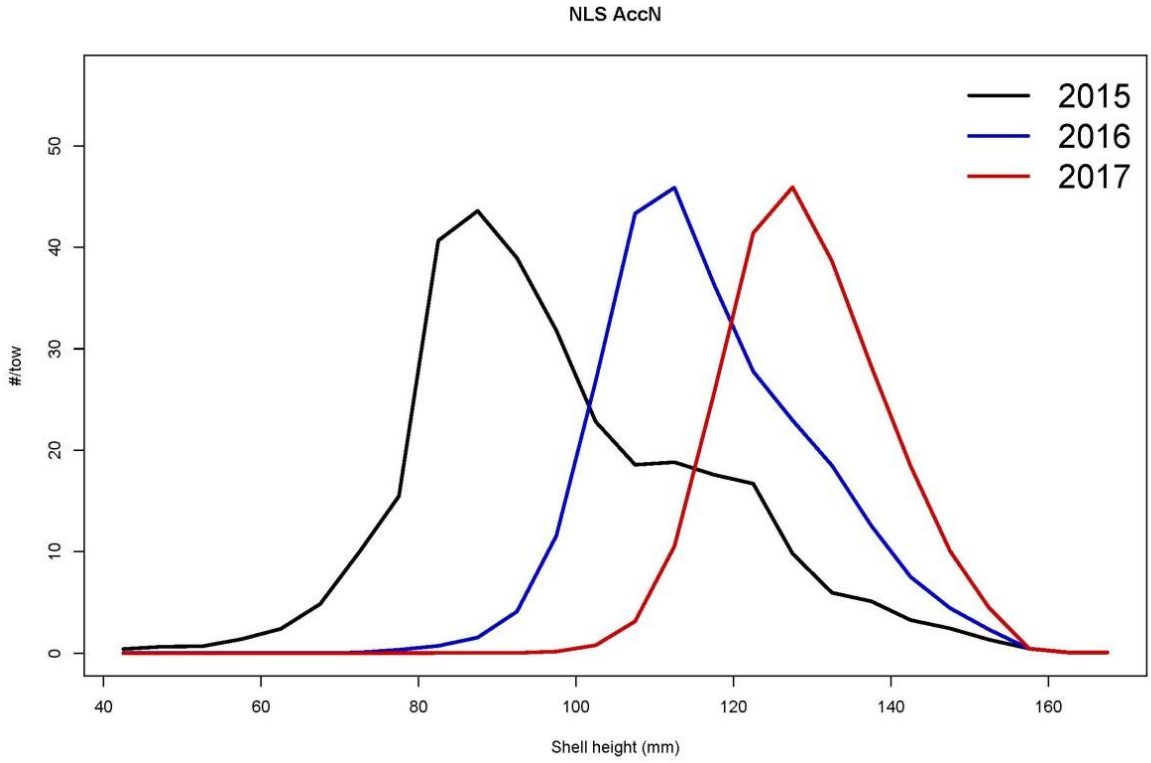
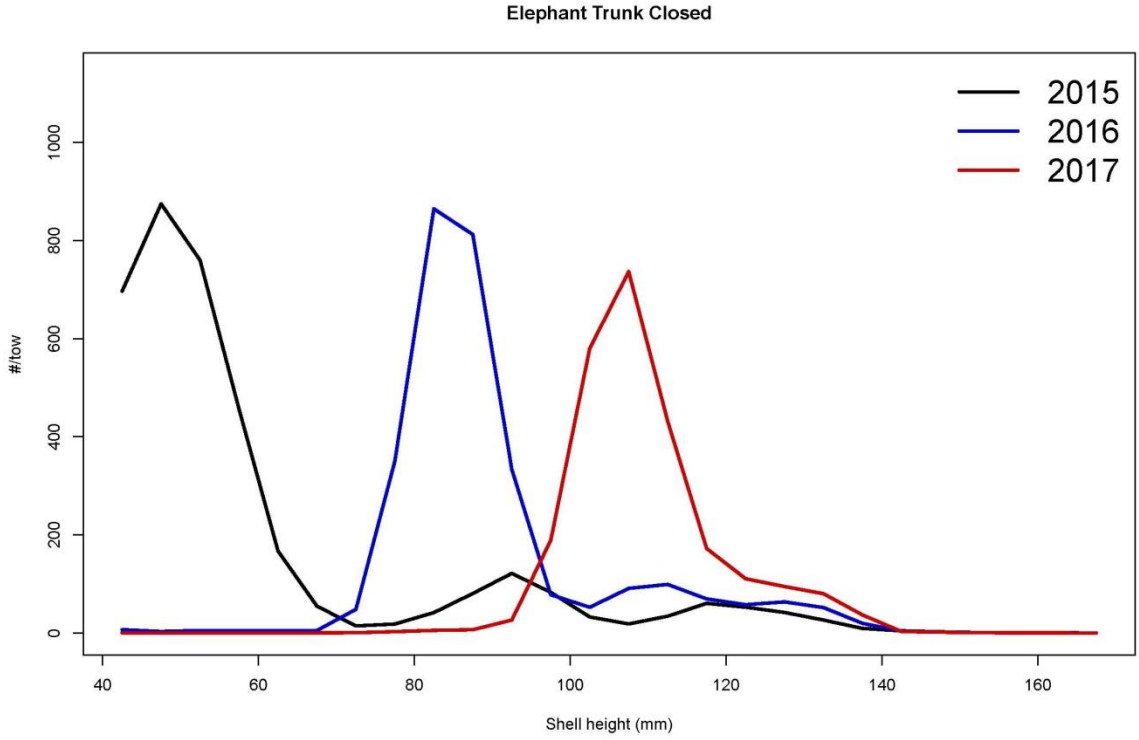


Figure 59 – Projected shell height frequencies for the proposed closure within ETA



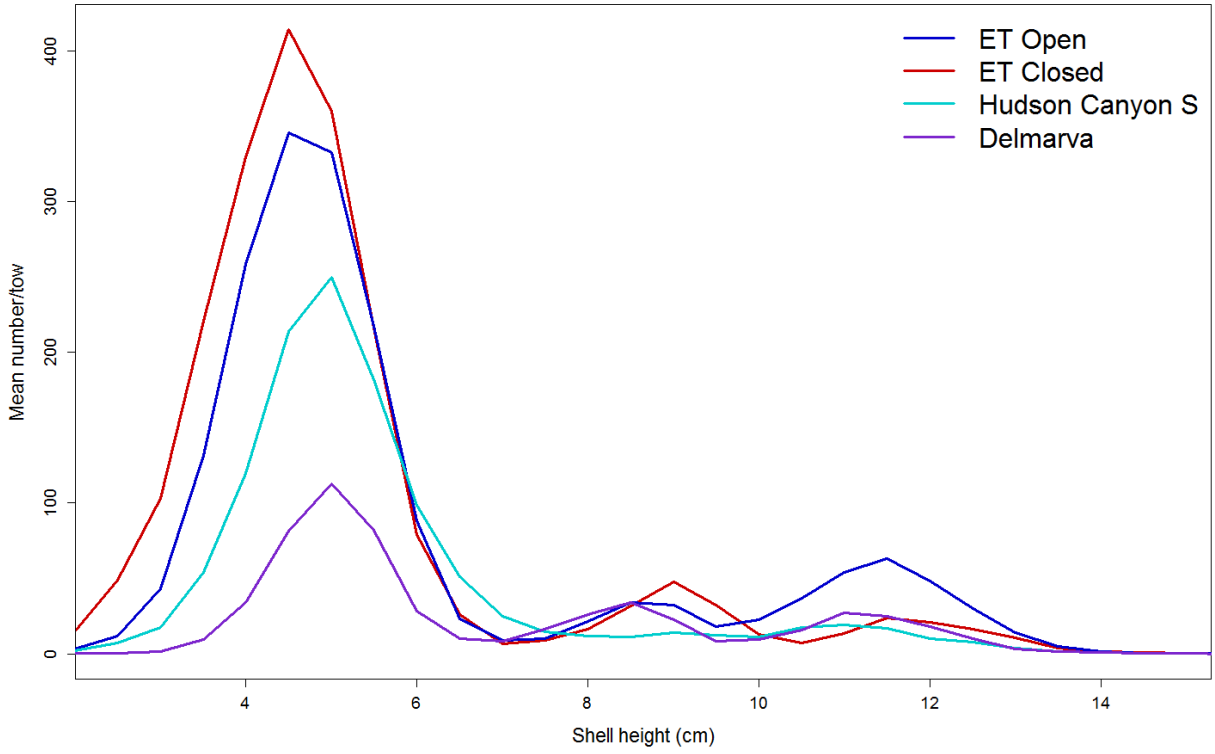
5.1.2.1.7 Evaluation of existing ETA closed

Table 75 gives the biomass estimates per area based on 2014 survey results, the projected biomass in 2015 from the FW26 projections, and the biomass estimates in this year's surveys (2015). In all cases, biomasses increased more than projected - only slightly more in ET open, and much more in the other areas. Of particular note is ET closed, whose biomass was projected to increase by 212%, but actually increased by 386%. Much or all of the increases over the projections is likely due to the strong recruitment.

Table 75 – Projected and actual increase in biomass comparing: 1) estimates from 2014 survey results; 2) 2015 projections from 2014 results; and 3) 2015 survey results

	HC	ET Open	ET closed	DMV
Survey 2014	10,216	21,344	3,784	7,804
Projection for 2015 (FW26)	11,509	24,581	11,800	8,777
Survey 2015	15,517	25,013	18,372	16,122
Proj. increase	13%	15%	212%	12%
Actual increase	52%	17%	386%	107%

Figure 60 – Mean shell height frequencies per area from 2015 VIMS dredge survey (cm)



5.1.2.1.8 Additional mortality from the potential for highgrading behavior

The PDT included an additional run to illustrate the potential impacts of highgrading, or mortality of scallops brought on deck but discarded for larger scallops since they have a higher price premium. There is always the potential to highgrade, and the PDT does not believe this is a major issue in the fishery currently, but there are several reasons why there may be increased incentive to highgrade, in particular in NL.

First, there is currently a historically high price premium for larger scallops (more detail in Section 5.4.3.8). Second, the size frequency of biomass in NL is mixed. Figure 61 shows the size frequency of scallops in NL from the 2015 survey (in black). While some of the scallops are 100mm and larger, the majority are not, and are not projected to be completely exploitable to the gear until 2017. Therefore, some scallops will experience discard and incidental mortality in that area while vessels target larger scallops. Third, the growth potential for scallops in that area is relatively high compared to other areas, and in general the meat quality is high; therefore, the yield potential is higher per animal in that area compared to other areas. Finally, due to the close proximity to shore overall costs are not as high for some vessels to fish in this area; therefore, vessels may be inclined to fish longer to find larger scallops.

For all these reasons the PDT discussed evaluating the potential impacts of highgrading on future biomass and landings in NL only. The base run (Alternative 2) keeps NL closed, a "best case" run (Alternative 5) opens NL with a removal of about 900,000 pounds and assumes vessels will land what is caught, no highgrading behavior. A "worst case" run was also completed assuming that all landings from NL in 2016 would be u10 in size, thus all scallops smaller would be discarded. In reality, the realized landings and future projections may be somewhere between these runs, but evaluating both gives a sense of these potential effects.

Figure 61 – Shell height frequencies from 2015 dredge survey stations in NL-north as well as projected shell height frequencies for 2016 and 2017

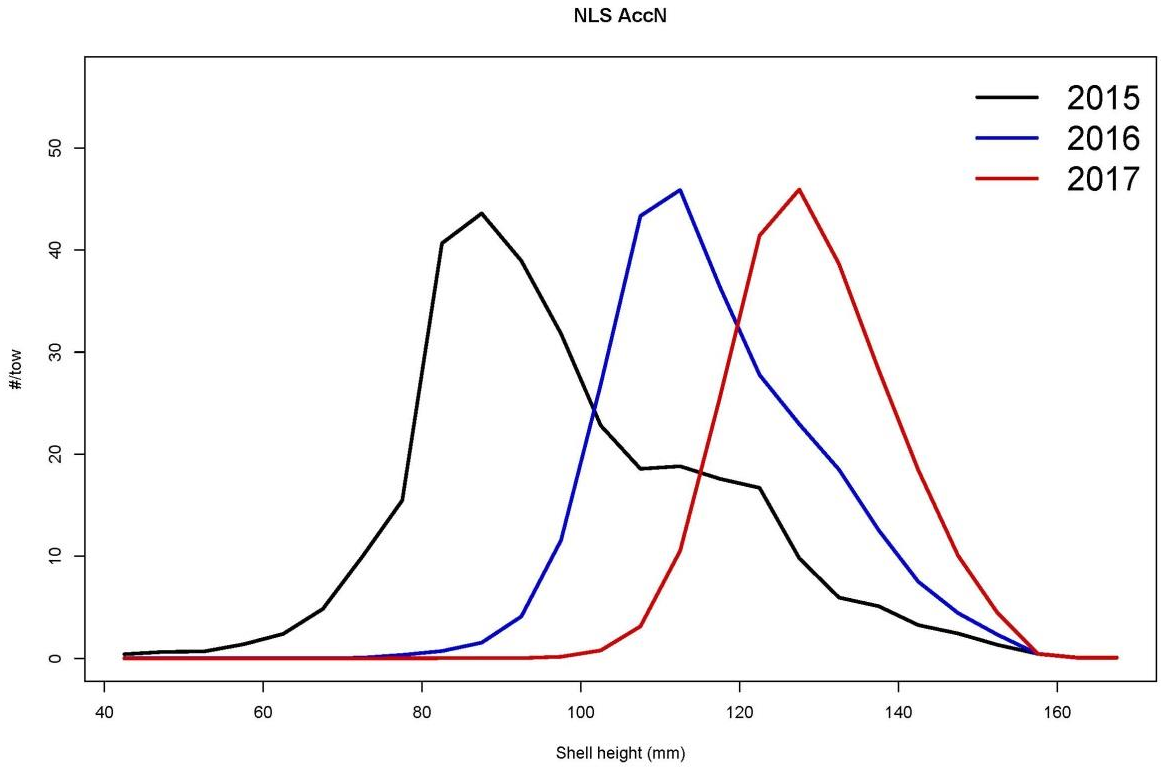
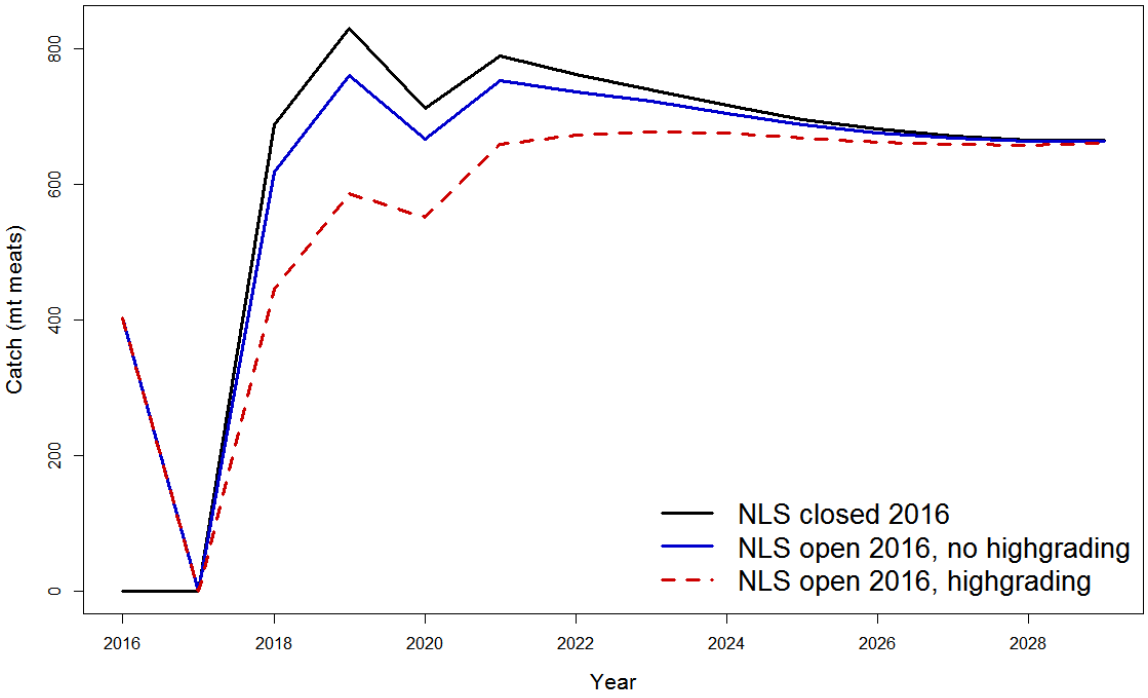


Figure 62 – Comparison of projected landings for the base run (NL closed), a best case scenario for limited access to NL with no highgrading (blue), and a worst case scenario for NL access with highgrading (red)



5.1.2.1.9 The potential for additional mortality of juvenile scallops in high density areas

The last time there were high densities of scallops in Elephant Trunk (2003) there was very high natural mortality of juvenile scallops; such density-dependent natural mortality is not built into the current forecasting model (Figure 63). In this case, in the absence of fishing pressure, the biomass estimates in ETA reduced by much more than 20% (assumption used for natural mortality); it was closer to 50% from 2003 to 2004 and again from 2004 to 2005. Figure 64 is a semi-log plot of mean Elephant Trunk numbers from the dredge surveys between 2003-2006 in ETA. Abundance dropped linearly (consistent with constant M) from 2003-2005 - the slope of the dashed line is -0.54, which compares with a normal natural mortality (M) of 0.2. The plot suggests there was no indication of elevated natural mortality after 2005, when scallops are larger.

There is one hypothesis discussed by the PDT that this increased mortality could be from increased predators, namely crabs, in areas with high densities of juvenile scallops,. If higher than normal natural mortality occurs, the projections of biomass and landings will be overestimated, especially for 2017. The model currently assumes constant natural mortality (0.16 on GB and 0.2 in the Mid-Atlantic on all sizes except the plus group). However, the PDT believes that natural mortality of juveniles is higher in areas of high density.

Figure 63 – Shell height frequencies from dredge surveys (2003-2007) for the Elephant Trunk rotational area

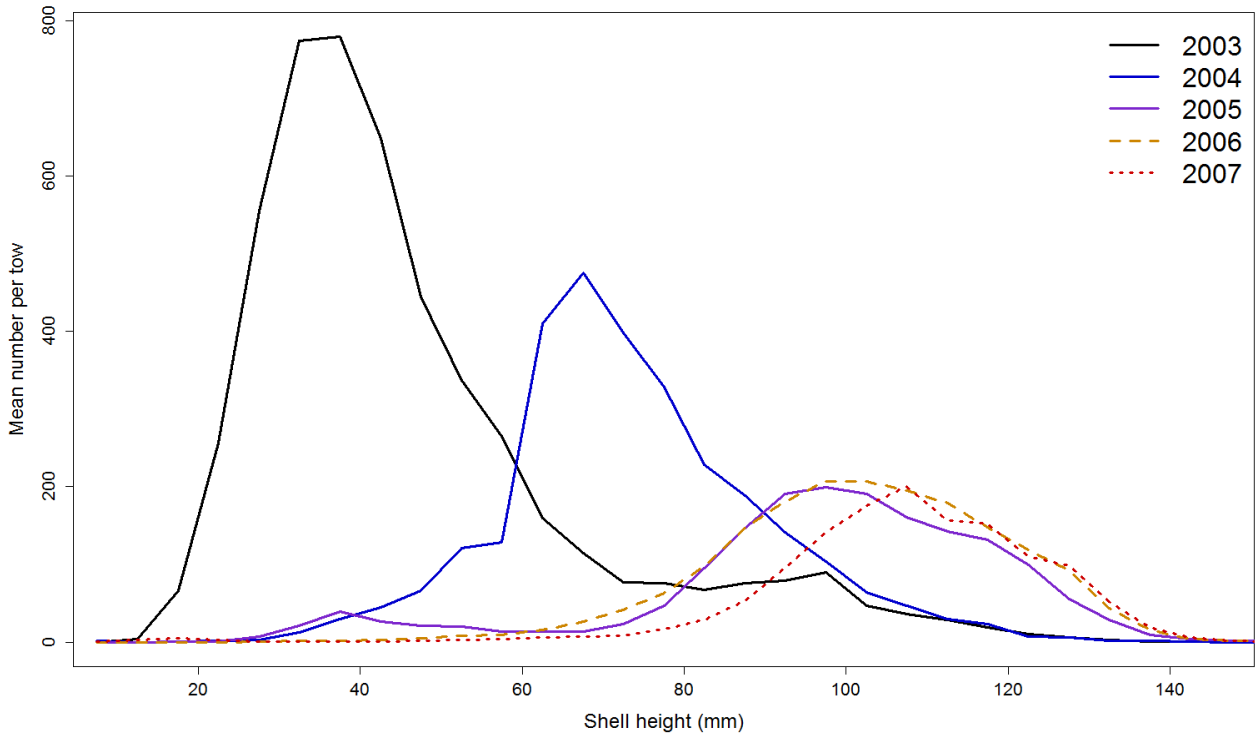
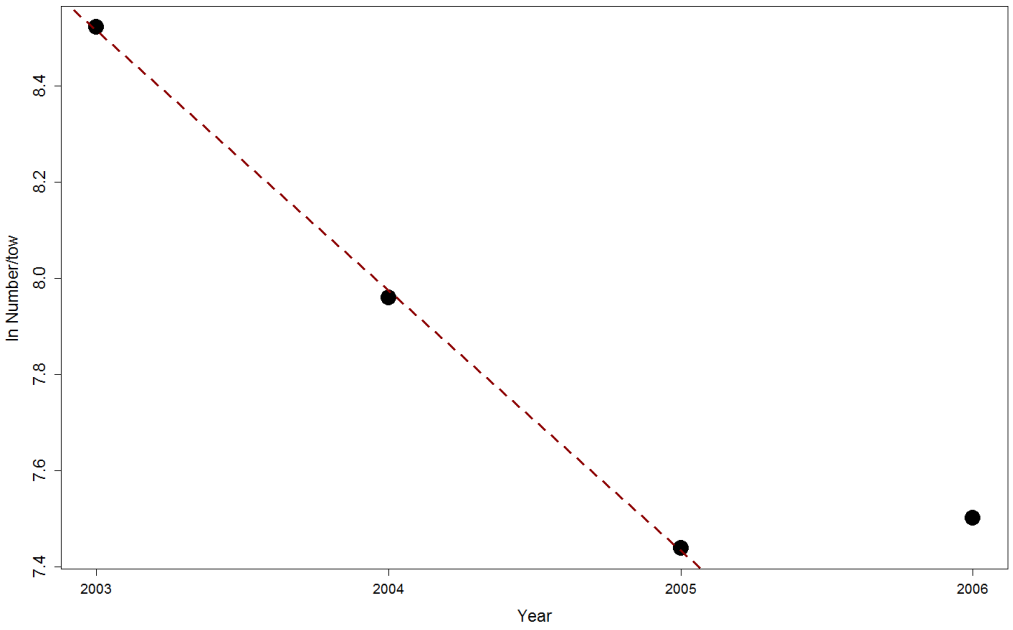


Figure 64 – Semi-log plot of mean ET numbers from dredge surveys



The PDT ran two additional runs to potentially capture the magnitude and impact of density dependence on the projection results. Both runs assumed higher natural mortality in several SAMS areas with high densities of juvenile scallops (i.e. the MAAA, NL and CA2extension). The "long-term" run assumed higher natural mortality in those areas for the entire time series (2016-2029). And the second "short-term run" assumed higher natural mortality would only be a factor for the initial conditions of the run and were only applied in year 1 (Table 76). The actual impacts may be somewhere between these two runs, but in terms of potential effects on future landings, the impacts of density dependent mortality may be 9-29% when all the years are combined. This suggests that projected landings for all of the alternatives in this action could be overestimating future landings by at least this much if density dependent effects are realized in areas with high densities of juvenile scallops. Projected landings for each alternative would potentially be impacted in a similar way, so there would be no difference in how the alternatives compared to each other, future projections are likely proportionally lower for all of them.

Table 76 – Projection of scallop landings for the base run (Alt 2) compared to two simulations that were done to capture the potential impacts of density dependent mortality in areas with high densities of juvenile scallops

	Values	Scenario				
	Sum of Total landings			Sum of Total landings2		
Fishing year	2. Basic alt	7.Dens.dep	8.DensdepincM	2. Basic alt	7.Dens.dep	8.DensdepincM
2016	48.5	47.9	48.5		-1%	0%
2017	82.9	67.0	73.0		-19%	-12%
2018	114.1	80.4	94.2		-30%	-17%
2019	131.9	81.9	108.3		-38%	-18%
2020	114.8	68.2	96.6		-41%	-16%
2021	94.8	58.2	82.3		-39%	-13%
2022	77.6	51.1	71.4		-34%	-8%
2023	68.0	47.3	65.1		-30%	-4%
2024	63.0	46.2	61.9		-27%	-2%
2025	61.1	46.0	60.9		-25%	0%
2026	61.6	46.2	61.0		-25%	-1%
2027	62.0	46.4	61.1		-25%	-2%
2028	60.9	46.5	61.6		-24%	1%
2029	65.0	49.1	63.2		-24%	-3%
Grand Total	**1106.3**	**782.3**	**1009.0**		**-29%**	**-9%**

5.1.2.2 Overall fishery allocations

A summary of the various allocation alternatives are described in **Table 13**.

5.1.2.2.1 Alternative 1 (No Action – Default measures from Framework 26)

Under No Action, the sub-ACL for the LA fishery would be 29,200 mt (64,374,490 lb.). The specifications would include default measures approved in Framework 26 for FY2016 which are 75% of the projected DAS for that year. For full-time vessels that is equivalent to 26 DAS (75% of 34 DAS) and 10.4 DAS for part-time vessels. LA vessels would have some access in the MA access area, the equivalent of one 17,000 pound trip for FT vessels. However, the area would not open for new 2016 allocations until April 1, 2016. These measures would remain in place until replaced by another action.

Under FY2016 default measures the LAGC IFQ allocation is 1,699 mt for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit. This allocation is equivalent to 5.5% of the ACL projected for FY2016 from FW26. LAGC IFQ vessels would also have access in the MA AA on April 1, 2016 under default measures, equal to 361,445 pounds or 602 trips (6.5% of the projected TAC for MA AA in 2016 under FW26).

No action for the NGOM hard TAC is 70,000 pounds and the target TAC for vessels with a LAGC Incidental permit is 50,000 pounds.

The Council recommended precautionary default measures for the second fishing year in FW26 knowing that this subsequent action would replace the default measures. Since the default measures from FW26 include much lower fishery allocations, when any of the FW27 specification alternatives are compared to No Action the total landings are higher and therefore would be characterized in this document as having negative impacts to the scallop resource compared to No Action. However, the No Action alternative is not realistic since the intent is to replace those temporary and partial measures with more updated/increased allocations after survey results are available for the following fishing year.

In general, the impacts of the No Action alternative are positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low (**Table 73**). Total biomass projections are higher under the No Action alternative in the early years, but in the long run the alternatives have similar biomass estimates (**Figure 44**). However, because landings are substantially lower than other alternatives the No Action does not optimize yield compared to other alternatives, and because it does not close areas with small scallops (i.e. south of Closed Area II), No Action may not improve yield per-recruit in those closed areas compared to other alternatives considered.

5.1.2.2.2 Alternative 2 – Basic Run

When the fishing target principles of the FMP are applied to the estimated biomass in each area for FY2016 the total projected catch is 48.5 million pounds. FT LA vessels would be awarded 36.53 DAS (before adjustments for the VMS corridor are taken into account), and 51,000 pounds in access areas. LAGC IFQ vessels would be allocated 4.47 million pounds, NGOM would be allocated 70,000 pounds, and a target TAC of 50,000 pounds for incidental permits would remain in place.

Estimates of fishing mortality are low under Alternative 2, thus the risk of overfishing is low for this alternative, as well as all the alternatives under consideration (**Table 73**). Total biomass projections are high under this alternative, and very similar to other alternatives under consideration in this action (**Figure 44**). The impacts of Alternative 2 on the scallop resource are neutral compared to No Action. While Alternative 2 includes more access in several access areas, this has a small impact on overall estimates of long term fishing mortality and biomass projections since the level of effort from these access area trips is low, and a relatively high proportion of total biomass is in areas that are closed to the fishery (GF and EFH closures).

Alternative 2 would have neutral impacts compared to Alternative 3 and 3a since these alternatives are very similar in terms of overall projected biomass and fishing mortality, with only one difference about closing additional area under Alternative 3 and 3a. Similarly, Alternative 2 would have neutral impacts compared to Alternative 4 and Alternative 5; the results for projected biomass and fishing mortality are essentially the same for all three alternatives. Since a large proportion of the total biomass is not available to the fishery the impacts on the scallop resource overall are relatively similar for all the alternatives under consideration.

5.1.2.2.3 Alternative 3 (Basic run for specifications and additional closure south of CA2 to further protect small scallops)

This alternative would close an area south of CA2 to protect small scallops. The fishery allocations and impacts would be very similar to other alternatives, but DAS would be reduced to allow for this new closure with lower total landings. FT LA vessels would be awarded 34.69 DAS (before adjustments for the VMS corridor are taken into account), and 51,000 pounds in access areas. LAGC IFQ vessels would be allocated 4.47 million pounds, NGOM would be allocated 70,000 pounds, and a target TAC of 50,000 pounds for incidental permits would remain in place.

Closing CA2 south extension costs about 1-2 DAS per FT LA vessel to convert that open area to a closed area. The projections of fishing mortality are slightly lower for this alternative

compared to others, but overall they are also very low, thus the risk of overfishing is low for this alternative (**Table 73**). Total biomass projections are high under this alternative, and very similar to other alternatives under consideration in this action (**Figure 44**). The impacts of Alternative 3 on the scallop resource are neutral compared to No Action. While Alternative 3 includes more access than No Action, the overall allocations are expected to have a small impact on overall estimates of long term fishing mortality and biomass projections.

Alternative 3 would have neutral impacts compared to Alternative 2 since these alternatives are very similar in terms of overall projected biomass and fishing mortality, with only one difference about closing additional area under Alternative 3. Similarly, Alternative 3 would have neutral impacts compared to Alternative 3a, Alternative 4 and Alternative 5; the results for projected biomass and fishing mortality are essentially the same for all three alternatives. Since a large proportion of the total biomass is not available to the fishery the impacts on the scallop resource overall are relatively similar for all the alternatives under consideration.

5.1.2.2.4 Alternative 3a Basic run with CA2 south extension and no access in CA2 (preferred alternative)

This alternative is the same as Alternative 3 except there would be no access in the scallop access area in CA2, instead those trips would be moved to the Mid-Atlantic access area.

The projections of fishing mortality are low for this alternative and very similar to other alternatives considered, thus the risk of overfishing is low for this alternative (**Table 73**). Total biomass projections are high under this alternative, and very similar to other alternatives under consideration in this action (**Figure 44**). The impacts of Alternative 3a on the scallop resource are neutral compared to No Action. While Alternative 3a includes more access than No Action, the overall allocations are expected to have a small impact on overall estimates of long term fishing mortality and biomass projections. However, the preferred alternative is expected to optimize yield and improve yield per recruit more than No Action because landings are higher and closures are included to protect small scallops and increase yield potential from those areas (ETA closure, NL extension, and area south of CA2 would all be closed under the preferred alternative).

Alternative 3a would have neutral impacts compared to Alternative 2 since these alternatives are very similar in terms of overall projected biomass and fishing mortality. Similarly, Alternative 3a would have neutral impacts compared to Alternative 3, Alternative 4 and Alternative 5; the results for projected biomass and fishing mortality are essentially the same for all three alternatives. Since a large proportion of the total biomass is not available to the fishery the impacts on the scallop resource overall are relatively similar for all the alternatives under consideration.

5.1.2.2.5 Alternative 4 - Basic run for specifications and expanded closure of ETA closed to further protect small scallops

This alternative includes the same fishery allocations as the basic run (Alternative 2) but it includes and expansion of the closure within ETA to the south and east to better protect small scallops observed in those areas. The fishery allocations are the same as Alternative 2 in terms of DAS, access area catch, and LAGC allocations.

Estimates of fishing mortality are low under Alternative 4, thus the risk of overfishing is low for this alternative, as well as all the alternatives under consideration (**Table 73**). Total biomass projections are high under this alternative, and very similar to other alternatives under consideration in this action (**Figure 44**). The impacts of Alternative 4 on the scallop resource are neutral compared to No Action. While Alternative 4 includes more access in several access areas, this has a small impact on overall estimates of long term fishing mortality and biomass projections since the level of effort from these access area trips is low, and a relatively high proportion of total biomass is in areas that are closed to the fishery (GF and EFH closures).

Alternative 4 would have neutral impacts compared to Alternative 3, 3a and 5 since these alternatives are very similar in terms of overall projected biomass and fishing mortality. Since a large proportion of the total biomass is not available to the fishery under any of the alternatives, the impacts on the scallop resource overall are relatively similar for all the alternatives under consideration.

5.1.2.2.6 Alternative 5 - Basic run for specifications and include limited allocation of effort in northern part of Nantucket Lightship Access Area

This alternative includes the same fishery allocations as the basic run (Alternative 2) but about 1.0 million pounds of the same total catch would be available from the northern portion of NL (north of 40° 30 N). Aside from that, the fishery allocations are the same as Alternative 2 in terms of DAS, access area catch, and LAGC allocations.

Estimates of fishing mortality are low under Alternative 5, thus the risk of overfishing is low for this alternative, as well as all the alternatives under consideration (**Table 73**). Total biomass projections are high under this alternative, and very similar to other alternatives under consideration in this action (**Figure 44**). The impacts of Alternative 5 on the scallop resource are neutral compared to No Action. While Alternative 4 includes more access in several access areas, this has a small impact on overall estimates of long term fishing mortality and biomass projections since the level of effort from these access area trips is low, and a relatively high proportion of total biomass is in areas that are closed to the fishery (GF and EFH closures).

Alternative 5 would have neutral impacts compared to Alternative 3, 3a and 4 since these alternatives are very similar in terms of overall projected biomass and fishing mortality. Since a large proportion of the total biomass is not available to the fishery under any of the alternatives, the impacts on the scallop resource overall are relatively similar for all the alternatives under consideration.

5.1.3 Default measures for FY2017 (preferred alternative)

In general, default measures are put in place to provide some level of access to the fishery until final specifications can be implemented in a subsequent action based on updated data. In recent years the Council has allocated the full projected sub-ACL to LAGC vessels and about 75% of DAS to the LA fishery, and in some cases a limited amount of access area effort as well. In this action the PDT is not recommending including access area effort under default to either fleet. There are high densities of juvenile scallops in many areas and if access area effort is not available until April or later that could have beneficial impacts on smaller scallops in access areas. Scallops would have more time to grow and catch rates typically improve in April and later. Finally, adjustments are under consideration for how final scallop specification actions are reviewed and proposed by NMFS, which could speed up the overall implementation of

specifications. Therefore, the length of time default measures may be in place is expected to be less than previous years. Overall there could be come beneficial impacts on the resource and fishery if default measures are less than projections at the start of the fishing year, and it is more precautionary to wait until more updated data are available before setting final allocations.

5.1.4 Allocation method for LA access areas

This action considered three alternatives for the method of allocating access areas to LA FT vessels: No Action (equal allocation per area); lottery allocation if NL is closed (lottery for the third trip in MAAA and CA2); and lottery allocation if NL is open to the LA fleet (lottery for the third trip in MAAA, CA2, and NL-north). For 2016, each full-time limited access vessel is proposed to receive 51,000 pounds; the equivalent of three 17,000 pound trips. Under Option 1 those would all be allocated from MAAA. Under the first lottery option when NL is closed, two trips would be allocated in MAAA to all vessels and the third would be allocated by lottery from either MAAA or CA2. Under Option 2, the equivalent of two trips would be allocated in MAAA and the third would come from either MAAA, CA2, or NL-N. The exact number of trips per area are shown in Table 14 for Option 1 and Table 15 for Option 2. Since the preferred alternative does not include access in CA2 of NL-north for LA vessels, the No Action alternative is preferred for this section; no lottery.

In this case the No Action alternative, no lottery, has low negative impacts on the resource because the current biomass conditions support some level of access in CA2south. However, since the proposed specification alternative does not include access in that area (Alternative 3a), and instead the CA2 trips have been shifted to MAAA, there would be higher fishing mortality expected in MAAA from the 2 million pounds of allocation that would be added to that area (Alternative 3 versus Alternative 3a). This shift is not expected to have long term impacts on the resource since the differences in biomass, landings, area swept and fishing mortality are generally similar, and there are also some benefits from leaving CA2 south closed that would balance some of these low negative impacts.

In general, both lottery options are expected to have neutral impacts on the resource. Since trips would be allocated and distributed based on projected biomass results, the overall impacts should be minimal provided fishing mortality targets are not set to high in each area. Under all three methods for access area allocations a LA vessel would need to fish in a particular area. If projections are underestimated a vessel may need to fish longer to attain the possession limit, which can have negative impacts on the resource if catch rates fall very low. However, vessels can carryover access area trips to the first 60 days of the following year, so if catch rates are low, a vessel can wait to fish remaining catch in March and April of 2017, potentially minimizing any negative impacts on the resource from fishing areas with lower catch rates.

It should be noted that trips allocated into the MAAA could be fished in any part of the MAAA, excluding the closure within ETA. Allowing vessels the flexibility to fish within the MAAA is expected to have slight positive to slight negative impacts on the resource and depends on fishing behavior. Impacts may be slightly positive if vessels are given flexibility to fish access areas trips if they decide to fish those trips in areas with the highest catch rates. Biomass projections are uncertain and if catch rates are underestimated for a particular area, it could take a vessel longer to harvest their allocation, having potentially low negative impacts on the resource. Therefore, if a vessel has the flexibility to fish within MAAA compared to only one of the MA access areas there could be low positive impacts.

On the other hand, flexibility could also increase fishing pressure in some areas to a level that could have some negative impacts on the resource. Potential impacts of this alternative may be more uncertain because there is less control on where vessels fish. In theory if a vessel is fishing in an access area and catch rates drop off the vessel would move to a higher catch area. However, on access areas trips vessels are not on the clock, so they may decide to continue fishing in a lower catch area for other reasons (i.e. distance from port, etc.). This can have the potential to have negative impacts on the resource if vessels decide to fish in lower catch areas for other reasons. Since these potential impacts are dependent on fishing behavior the overall impact on the resource could range from low negative to low positive. Based on the limited experience with MAAA flexible access, the fleet was somewhat spread out but mostly concentrated in ETA, which was expected (Figure 48). Effort was lower in Delmarva primarily due to the presence of a parasitic worm that was observed by the industry and resource surveys conducted in the area. This issue may have further pushed effort into ETA and HC that would have otherwise been fished in Delmarva. It is uncertain if the nematode observed last year will persist.

Finally, impacts may be more uncertain from trips allocated in MAAA versus individual areas within the MAAA if there is reduced ability to monitor where catch is coming from. Overall the potential impacts on the resource range from low positive to low negative depending on fishing behavior, but ultimately catch will be constrained by the total allocation in access areas and if effort is distributed unevenly, future surveys will indicate if one area needs to be fished less. Therefore, any potential negative impacts are likely to be short term and non-significant.

5.1.5 Allocation of LAGC IFQ trips in access areas

The LAGC IFQ fishery is allocated a fleetwide total number of access area trips. Individual vessels are not required to take trips in specific areas like access area trips allocated to the limited access fishery. Instead, a maximum number of trips is identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year.

This action is considering four allocation options for allocating fleetwide trips to the LAGC IFQ fishery and three area options related to the number of maximum trips per area (See Table 17). Option 1 is No Action; default trips from FW26 (602 total trips in MAAA starting on April 1); Option 2 the number of trips would be based on the total proportion of catch from AA compared to open areas (34% for 2,553 trips); Option 3 would be equal to the same total allocation the LAGC fishery has (5.5% of the ACL – equivalent to 1,523 trips); and Option 4 the status quo number of trips from FY2015 (2,065 trips). The preferred alternative for the LAGC allocation alternative in Option 2. The three area options are: all trips in MAAA (Option 1), prorate CA2 trips to MAAA and NL evenly (Option 2), and prorate all CA2 trips to NL (Option 3). Option 3 is the preferred alternative for the area option for LAGC access area trips.

5.1.5.1 LAGC AA Allocations (total number of fleetwide trips)

If trips are not taken in these areas, LAGC catch is assumed to be taken in open areas instead. In some cases, catch rates are higher in access areas so it may take longer for a LAGC vessel to fish for IFQ in open areas; however, in other cases catch rates can be higher in some open areas compared to access areas. Overall, LAGC catch in access areas is a small percentage of the overall catch and vessels tend to fish where catch rates are higher, so if they are higher in access

areas most trips should be fished there, and if they are not more LAGC catch could come from open areas.

For the most part, and in the past, LAGC catch in access areas is a small percentage of the overall catch, thus the spatial impacts of removing that catch in one area and not another are minimal. However, in 2016 the overall LAGC fishery allocation is higher than it has been in recent years. Therefore, the total removal from access areas from LAGC vessels could be higher than recent years depending on the option selected, and vessel behavior. Therefore, overall fishing mortality from a particular access area could be higher than projected in some cases, which could have potentially low negative LT impacts on the resource. But these potential increases are limited; for example, in 2015 the LAGC fishery was allocated 2,056 trips in access areas, and in this action only one option under consideration would allocate more trips than 2015 levels (Option 2 at 2,553 trips or about 300,000 pounds higher than the 2015 allocation of 2,065 trips or 1.2 million pounds).

Under No Action (Option 1) LAGC IFQ vessels would be allocated default trips from FW26 (602 total trips or about 360,000 pounds). Under this option most LAGC catch would come from open areas. Since the overall allocation of LAGC IFQ is a relatively small proportion of total scallop catch the location of effort does not have a major impact on the resource. However, in 2016 the LAGC fishery allocation is relatively higher than recent years (about 4.4 million pounds) because it is based on the total ABC from all areas. Thus, if the full LAGC quota is harvested, primarily from open areas, impacts of Option 1 are potentially low negative on the scallop resource in nearshore areas since more total removals would need to come from those areas compared to recent years (about 4 million pounds since Option 1 would only provide about 360,000 pounds from AA under No Action).

Option 2 would allocate about 1.5 million pounds of the total LAGC allocation of 4.4 million pounds from access areas, so that would reduce impacts on the resource in open areas by providing more access in access areas. However about 3 million pounds would still be left of the LAGC quota to be harvested in open areas. Overall this option could have potentially low positive impacts on the resource overall by spreading effort out and providing more access in higher catch rate areas potentially reducing total area swept compared to other options. However, the specification projections did not account for this level of LAGC allocation when the AA allocations were developed for the LA fishery (three 17,000 pound trips per FT LA vessel). Therefore, the more effort allocated to the LAGC fishery in AA could potentially increase fishing mortality in the access areas above projected levels.

Option 3 would allocate 5.5% of each area TAC to the LAGC IFQ fishery in fleetwide trips per access area. In theory this option could also have potentially low positive impacts on the resource compared to No Action because more LAGC IFQ effort would be distributed over more areas and not as much in open areas. This option may have less positive impact compared to Option 2 because it potentially does not spread effort out as much as Option 2. Finally, Option 4 would provide the same number of access area trips as FY2015, about 2,000 trips or 1.2 million pounds. The potential impacts of this option overall on the resource fall between Option 2 and 3, low positive impacts compared to No Action, but less than Option 2 and more than Option 3.

It should be noted that these trips are voluntary, and even if LAGC IFQ trips are available in access areas, the fleet may choose to fish in open areas instead. Therefore, the impacts of these

measures are generally low positive if LAGC vessels choose to fish in access areas and reduce area swept by fishing in high density areas, and generally neutral if vessels instead choose to fish in open areas. Ultimately, since the overall LAGC catch in access areas is generally a small percentage of the overall catch the spatial impacts of removing that catch in one area and not another are minimal. However, the more LAGC effort allocated to an area the higher the impacts can be if other allocations are not reduced to compensate for that allocation (LA possession limit).

5.1.5.2 LAGC AA Allocations (by area)

In addition to the four overall allocation alternatives, this action considered three different area options for where LAGC access area trips should be allocated. Option 1 is that all trips would be allocated in MAAA; Option 2 would prorate CA2 trips to MAAA and NL evenly; and Option 3 would prorate all CA2 trips to NL only (Table 17). Option 3 is the preferred alternative for the area option for LAGC access area trips. Overall there are minimal differences in overall impacts on the resource from these three area alternatives. So long as the access areas have similar catch rates, the impacts overall should be similar.

Some concerns were raised that there may be more potential for highgrading in NL compared to other access areas, see Section 5.1.2.1.8 for more detail. If highgrading does occur the actual fishing mortality in that area could be greater than projections. For example, a removal of 300,000 pounds from that are is not expected to have much of an overall impact on the resource. But that is based on the assumption that the majority of scallops brought on deck would be landed and smaller scallops would not be discarded. An additional run was completed to evaluate the potential impacts of highgrading at this level of access in NL-N (Scenario 3a with highgrading). Even if all LAGC vessels highgraded on every trip in NL-N so all landings were u10s (ten scallops per pound, the largest size class), the overall impact on the resource is relatively minor in the long term since the total level of access is relatively low (300,000 pounds total). Projected biomass is lower for the run with assumed highgrading (Alternative 3a with highgrading), but the differences are relatively minor (Table 77). In summary, any potential negative impact of access in this area could be higher if highgrading behavior occurs.

In mid-November the Scallop Committee requested the PDT analyze the potential effects of a reduced level of access in NL-N for LAGC vessels only. In summary, the PDT did not raise any major biological concerns with a relatively low level of access in NL-N. Overall, the PDT explained that the biological models used to assess the impacts on the resource are not precise enough to pick up the impacts of small changes in access. Especially when some fishing areas do not overlap with current survey areas (i.e. some inshore areas where LAGC vessels fish). The PDT did not endorse nor oppose exclusive access in NL-north in 2016 for the LAGC fishery, and commented that the alternative is primarily a policy decision and there are potential costs and benefits to consider. Section 5.4.3.12 describes some of the potential economic impacts of these options of different segments of the fishery.

Table 77 – Estimate of projected biomass for Alternative 3a with and without an assumption of highgrading behavior in NL-north

Fishing year	Alt.3A	Alt.3A highgrade	Diff (mt)
2016	312,360	312,360	0
2017	391,934	391,599	335
2018	405,745	405,417	328
2019	372,861	372,608	253
2020	313,285	313,105	180
2021	262,305	262,176	129
2022	228,164	228,076	88
2023	207,328	207,269	59
2024	194,195	194,155	40
2025	185,981	185,954	27
2026	180,261	180,243	18
2027	175,707	175,695	12
2028	174,126	174,118	8
2029	173,841	173,836	5
LT sum	3,578,093	3,576,611	1,482

5.1.6 Additional measures to reduce impacts on small scallops

This action is considering three alternatives for this issue, in addition to the specific area closures considered in the overall specifications alternatives. Alternative 1(No Action) would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 is status quo related to RSA fishing, which allows compensation in any area open to the fishery. Finally, Alternative 3 would prohibit RSA compensation fishing in NL north, but allow it in any other area open to the fishery. Alternative 1 could have low negative impacts on the resource because some of the more productive areas are within access areas. If vessels are prevented to fish in them the overall area swept and impacts on the resource could be increased.

In general, Alternative 2 is expected to have neutral impacts on the resource. Vessels are currently allowed to fish RSA compensation from any access area that is open to the fishery; therefore, maintaining this option would likely have similar impacts on the resource. However, vessels do not currently have access to NL because it is currently closed. If NL is opened in this action and RSA fishing were allowed under Alternative 2, there could be negative impacts on the resource. The specification that is considering access in NL includes about 900,000 pounds of access. If RSA fishing were allowed that has the potential to be an additional 1.25 million pounds. Because this area is so close to shore and in most years the area has scallops of high quality there may be incentive to fish a large proportion of the total RSA from that access area. This could have negative impacts on the high densities of juvenile scallops that have been observed in that area.

Alternative 3 is expected to have low positive impacts on the resource by preventing RSA fishing in NL for the reasons described above. Reducing access in NL in 2016 should increase

the overall yield of high concentrations of small scallops observed in that area, which can have positive impacts on the resource.

5.2 ESSENTIAL FISH HABITAT IMPACTS

This section is a qualitative review of the possible impacts to Essential Fish Habitat that could result from adoption of alternatives included in this framework adjustment. These evaluations consider impacts to benthic habitat generally, across the EFH designations for various species (scallops, groundfish, etc.) in aggregate, rather than evaluating impacts at the level of individual EFH designations. This is consistent with the fact that there are considerable spatial overlaps between individual EFH designations in areas where the scallop fishery operates.

Scallop dredges and trawls can generate adverse impacts to EFH that are more than minimal and not temporary. The magnitude of adverse effects is generally related to (1) the location of fishing effort, because habitat vulnerability is spatially heterogeneous, and (2) the amount of fishing effort, specifically the amount of seabed area swept or bottom time. To the extent that an alternative would shift fishing to more vulnerable habitats, and/or increase seabed area swept, its adoption would be expected to cause negative habitat impacts. If adoption of an alternative is expected to reduce seabed area swept or cause fishing effort to shift away from more vulnerable into less vulnerable habitats, a positive habitat impact would be expected. The magnitude of these effects relates to the proportion of total scallop fishing effort that is affected by a particular alternative.

Rotational management is related to the magnitude of adverse impacts in the scallop fishery. A primary objective of rotational management is to harvest scallops in ways that maximize yield potential. Subject to a given fishing mortality limit, harvesting larger animals that live at high densities, which is typical of scallops in access areas, should reduce the amount of area contacted by fishing gear. This overall management approach, combined with a suite of areas where dredges and trawls are prohibited, minimizes the adverse effects of the scallop fishery on EFH, to the extent practicable. Note that the system of habitat closure areas is under revision via Omnibus Essential Fish Habitat Amendment 2 (expected implementation during the 2016-2017 scallop fishing year).

Implementing the various measures in this framework action may cause changes to both the magnitude and the direction of the fishery's adverse effects to EFH, although substantial changes are not expected. Bearing in mind that both the direction and magnitude of changes are difficult to predict, because changes in fishing behavior in response to management actions can be difficult to predict, adverse effects could shift as follows:

- The lower No Action specifications would have low positive impacts on EFH relative to the various alternative specifications (Alternatives 2, 3, 3a, 4, and 5). The alternative specifications are predicted to be similar to one another in terms of their potential impacts to EFH.
- Allocating more access areas trips to limited access vessels (Option 2) should have slightly positive impacts on EFH relative to alternatives that allocated fewer access area trips.

- Changes to the areas where RSA compensation trips can be taken affect a small amount of fishing effort and are therefore expected to have neutral or very slight impacts on EFH.
- Limited access vessel access area allocation alternatives are expected to have neutral impacts on EFH.

5.2.1 Overfishing limit and annual biological catch

5.2.1.1 Alternative 1 - No Action for OFL and ABC

Under "No Action", the overall OFL and ABC for 2016 would be the default 2016 values adopted in Framework 26. The No Action ABC including discards is 37,903 mt, about 83.5 million pounds. This default amount is substantially lower than the proposed FY2016 ABC (Alternative 2), which is 55,737 mt or 123 million pounds, including discards. There are no default values for 2017.

Several fishery allocations are directly based on the ABC, specifically observer set-aside, research set-aside allocation, and the LAGC IFQ sub-ACL. The research set-aside is a set poundage every year of 267 mt, or 1.25 million pounds. These allocations that are directly related to the ABC would be lower under Alternative 1/No Action as compared to Alternative 2. Therefore the largest direct impact of maintaining the lower Alternative 1 ABC is that there would be a smaller allocation to the LAGC fishery. Otherwise, the Annual Catch Target (see fishery specification alternatives below), and not the ABC itself, is the primary determinant of fishing effort in the scallop fishery. However, the ACT is derived from the ABC.

The Alternative 1 ABC will result in lower LAGC effort, and indirectly in lower LA effort, which will lead to a general decrease in fishing impacts to habitat relative to Alternative 2.

5.2.1.2 Alternative 2 - Updated OFL and ABC for FY2016 and FY2017 (default, *preferred alternative*)

As noted above, the Alternative 2 ABC for FY 2016 is nearly 18,000 mt larger than the No Action ABC. This increase is due to very large recruitment on both GB and MA in the last two years. Although the projections for FY2017 suggested an even greater increase, the SSC recommended that the default 2017 ABC remain at the 2016 level to manage risk associated with uncertainty in mortality rates for juveniles in high density areas.

Several fishery allocations are directly based on the ABC, specifically observer set-aside, research set-aside allocation, and the LAGC IFQ sub-ACL. Therefore, all of these allocations for 2016 will increase relative to No Action. The Alternative 2 ABC will result in higher LAGC effort, and indirectly in higher LA effort, which will lead to a general increase in fishing impacts to habitat relative to Alternative 1/No Action. However, these updated values are consistent with the most recent data and are expected to be a more accurate estimation for the scallop resource, thus maintaining catch efficiency over time in the fishery. Of greater concern would be higher catch allocations that are not supported by scallop biomass, such that landings per unit effort decline and area swept increases relative to landings.

5.2.2 Fishery specifications

Specifications for the limited access fishery include days at sea and access area trips. These as limited by the Annual Catch Target for this segment of the fishery, and available fishing areas. Specifications for the limited access general category fishery include an overall IFQ allocation, a hard TAC for the northern Gulf of Maine, and a target TAC for LAGC incidental catch permits.

5.2.2.1 Overall fishery allocations

Specification alternatives 1-4 are compared in terms of their impacts to EFH using the projected bottom area swept values from the SAMS model simulations (see scallop resource impacts section for details). These area swept estimates are closely related to the LPUE estimates. Generally, scenarios with higher LPUE have lower area swept, and scenarios with lower LPUE have higher area swept.

5.2.2.1.1 Alternative 1 - No Action

In the scallop FMP, the No Action specifications are 75% of the default from the previous specifications framework, with no access area allocations. No Action specifications are 26 DAS for full-time vessels and 10.4 DAS for part-time vessels.

Under FY2016 default measures the LAGC IFQ allocation is 1,699 mt for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit, including some access to the Mid-Atlantic access areas. No action for the NGOM hard TAC is 70,000 pounds and the target TAC for vessels with a LAGC Incidental permit is 50,000 pounds.

During 2016, Alternative 1/No Action has lower allocations than the alternative specifications, and does not include access area trips. Thus, 2016 effort and area swept would be lower under this alternative, as compared to any of the action alternatives, resulting in fewer impacts to EFH during 2016.

5.2.2.1.2 Alternative 2 – Basic run using fishing mortality target principles with no modifications to scallop access area boundaries

2016 specifications for this alternative are:

- **Total FY2016 projected catch 48.5 million pounds**
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- **36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels.**
- Access areas open: the **Mid-Atlantic Access Areas and Closed Area 2.** Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- **No new closures.**

Impacts for Alternative 2 and all other action alternatives on EFH are expected to be greater than the No Action alternative. Specifically the projected area swept in 2016 associated with this alternative is 55% greater than that associated with Alternative 1, and 5% greater than

Alternative 3A, which is preferred. This alternative has slightly higher area swept and therefore probably has slightly higher impacts to EFH relative to Alternative 3a for two reasons. First, the DAS under this alternative are slightly higher, such that projected total catch is also higher. Second, catch rates in the CA2 access area are likely to be lower than those in the MAAA, so harvesting some of the access area possession limit from CA2 as specified in this alternative is expected to have higher area swept. Overall, substantial differences in impacts to EFH from this alternative relative to other action alternatives, including the preferred alternative, are not expected.

5.2.2.1.3 Alternative 3 – Basic run with additional closure south of CA2

2016 specifications for this alternative are:

- **Total FY2016 projected catch 46.9 million pounds**
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- **34.69 DAS for LA FT vessel, 13.88 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels.**
- Access areas open: the **Mid-Atlantic Access Areas and Closed Area 2**. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- **New closure south of CA2 adjacent to existing access area.**

As noted above, impacts for Alternative 3 and all other action alternatives on EFH are expected to be greater than the No Action alternative. Specifically the projected area swept in 2016 associated with this alternative is 51% greater than that associated with Alternative 1, and 3% greater than Alternative 3A, which is preferred. The difference between 3 and 3a is that the current access area in CA2 would be open under Alternative 3, while that catch will be harvested from the MAAA in Alternative 3a. Total projected catch for Alternatives 3 and 3a is the same, 46.9 million pounds. This makes projected area swept in Alternative 3 the most similar to the preferred alternative, 3a. Overall, substantial differences in impacts to EFH from this alternative relative to other action alternatives, including the preferred alternative, are not expected.

5.2.2.1.3.1 Alternative 3a – Basic run with CA2 south extension but no access in CA2 (*preferred alternative*)

This is the same as Alternative 3, except that CA2 would remain closed, and all access area allocations to LA vessels would be fished in the Mid-Atlantic access areas. LACG vessels would be allowed to fish in the NL-north access area but that area would be closed to LA vessels. As noted above, impacts for Alternative 3a and all other action alternatives on EFH are expected to be greater than the No Action alternative. Alternative 3a has the lowest projected area swept of any of the action alternatives, and therefore the lowest EFH impacts are expected. This is the result of lower DAS allocations compared to Alternatives 2, 4, and 5, and fishing in the MAAA vs. CA2. Overall, substantial differences in impacts to EFH from this alternative relative to other action alternatives are not expected.

5.2.2.1.4 Alternative 4 – Basic run with expansion of ETA closure

2016 specifications for this alternative are:

- **Total FY2016 projected catch 48.5 million pounds**
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- **36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels.**
- Access areas open: the **Mid-Atlantic Access Areas and Closed Area 2.** Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.
- **Expansion of Elephant Trunk Closed Area.**

As noted above, impacts for Alternative 4 and all other action alternatives on EFH are expected to be greater than the No Action alternative. Alternative 4 has the highest projected area swept of any of the action alternatives, and therefore the highest EFH impacts are expected. This is due to DAS allocations that are higher than Alternatives 3 and 3a, fishing in CA2 vs. MAAA, and the expansion of the Elephant Trunk Closed Area. While the ETCA expansion is expected to provide protection for juvenile scallops in that area, there are also larger adults in the potential closure. Restricting access to resource in the ETCA will affect catch rates in other parts of the MAAA, given a fixed overall possession limit. Overall, substantial differences in impacts to EFH from this alternative relative to other action alternatives, including the preferred alternative, are not expected.

5.2.2.1.5 Alternative 5 – Basic run with limited effort in NL north

2016 specifications for this alternative are:

- **Total FY2016 projected catch 48.5 million pounds**
- LA sub-ACL is 76,842,134 pounds and the LAGC IFQ sub-ACL is 4,473,180 pounds
- **36.53 DAS for LA FT vessel, 14.61 DAS for LA PT vessel, and 2.92 DAS for LA occasional vessels.**
- Access areas open: the **Mid-Atlantic Access Areas, Closed Area 2, northern part of NL.** Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative (CA1 and NL).
- LAGC NGOM hard-TAC remains at 70,000 pounds and the LAGC Incidental target TAC remains at 50,000 pounds.

As noted above, impacts for Alternative 5 and all other action alternatives on EFH are expected to be greater than the No Action alternative. Alternative 5 is very similar to Alternative 2, except that it would allow fishing in the northern portion of NL. It has very similar projected area swept and therefore EFH impacts to Alternative 2, and slightly higher impacts than Alternatives 3 and 3a. Expected impacts are slightly lower than Alternative 4. Overall, substantial differences in impacts to EFH from this alternative relative to other action alternatives, including the preferred alternative, are not expected.

5.2.2.1.6 Default measures for FY2017 (preferred alternative)

The recommended default measures for 2017 are 75% of the projected DAS for 2017. Because projected DAS for 2017 are high relative to those for 2016, owing to large numbers of scallops projected to recruit to the fishery in specific areas, the default specifications for the LA fishery are actually fairly close to the specifications for FY2016 described in Alternatives 2-5. For the LAGC fishery, the PDT recommended maintaining the 2016 allocations as default specifications for 2017. Overall, setting default allocations in this manner, where they are highly likely to be below the 2017 specifications developed in the next framework, has positive impacts on EFH because it minimizes the likelihood of allocations that are higher than the resource can adequately support. If the stock does not grow as expected and default specifications were set too high, this could lead to reduced catch efficiency and therefore higher area swept and impacts to EFH.

5.2.2.2 Allocation method for LA access areas

There are two options for the lottery method used to assign trips to LA vessels. Option 1 would allocate all of the CA2 trips and some of the Mid-Atlantic AA trips by lottery, with part time vessels allowed to choose an area, or be allocated an area. Option 2 would allocate NL trips by lottery as well, with part time vessels receiving an allocation for one MAAA trip and an additional trip from one of the three areas.

Because the preferred alternative specifications (Alternative 3a) only allocates Mid-Atlantic access area trips for LA vessels, this alternative is not relevant for the preferred action. However, for Alternatives 2, 3, 4, and 5, combining the overall allocation options with the area options generates a matrix of specific allocation scenarios. Ultimately, overall fishing mortality in each access area is expected to be similar regardless of how the trips are allocated. It is likely that there is some variation between vessels in terms of their performance, such that seabed area swept in an access area could vary if a different grouping of vessels is allocated trips in the area. However, it is not possible to quantify these differences, and the ability to trade access trips between vessels should help to ensure that access area possession limits are harvested by the vessels best equipped to do so. Therefore, the allocation methods used are likely to have neutral impacts to EFH.

5.2.2.3 Allocation of LAGC IFQ trips in access areas

The LAGC IFQ fishery is allocated a fleetwide total number of access area trips, with a maximum number of trips identified for each area. Once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. There are four allocation options for the total number of LAGC trips and three area options that divide these trips by area, as shown below.

			Area allocations		
			1	2	3
			All trips in MAAA	Prorate CA2 trips to MAAA and NL evenly	Prorate all CA2 trips to NL
Allocation options	1	No Action – 602 trips	Not preferred	Not preferred	Not preferred
	2	2,553 trips (34% AA trips)	Not preferred	Not preferred	***Preferred***
	3	1, 523 trips (overall allocation of 5.5%)	Not preferred	Not preferred	Not preferred
	4	Status quo – 2,065 trips (same as FY 2015)	Not preferred	Not preferred	Not preferred

LAGC IFQ access area allocations are handled differently from LA access area allocations, in that LAGC allocations represent a cap on the total number of trips that can be taken in a given area. Fewer trips may be taken in each access area if fishing elsewhere (in another access area, or open areas) is more efficient. Thus, while the access area allocation approach selected will have some effects on where fishing occurs in the LAGC fishery, effort is expected to flow into areas where catch rates are high and costs such as travel distance from port are minimized. Fishing in areas with higher catch rates, such as access areas, helps to minimize impacts to EFH. Also, habitats vary in terms of their vulnerability to fishing gear impacts. In general, both the Nantucket Lightship and Mid-Atlantic Access Areas have habitat types that are lower vulnerability relative to some other fishing grounds on Georges Bank. Thus, the preferred approach, Option 2, which authorizes the highest number of trips into the access areas, and divides these trips between the MAAA and NL, should have slightly positive impacts to EFH relative to Options 4, 3, and 1.

5.2.3 Additional measures to reduce impacts on small scallops

This action is considering three alternatives for this issue, in addition to the specific area closures considered in the overall specifications alternatives. Alternative 1(No Action) would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 is status quo related to RSA fishing, which allows compensation in any area open to the fishery. Finally, Alternative 3 would prohibit RSA compensation fishing in NL north, but allow it in any other area open to the fishery. Overall, RSA compensation fishing is not a large contributor to overall fishing mortality, so adjusting the list of areas where RSA compensation trips can be fished is not likely to have a large influence on fishery impacts to EFH. The preferred alternative, Alternative 3, prohibits NL compensation trips. Because there are small scallops in the NL access area that could generate higher yields if left in the water for longer, the preferred alternative likely has slightly reduced

impacts on EFH over time as compared to the status quo alternative, Alternative 2, which would allow compensation fishing in NL because it will be open to the LAGC fishery in 2016. Overall, the impacts of these three alternatives on EFH are expected to be slight.

5.3 IMPACTS ON PROTECTED SPECIES

5.3.1 OVERFISHING LIMIT AND ANNUAL BIOLOGICAL CATCH

5.3.1.1 Alternative 1 - No Action for OFL and ABC

The overfishing limit and annual biological catch are the absolute limits the fishery is not allowed to exceed. Under "No Action", the overall OFL and ABC would be equivalent to default 2016 values adopted in Framework 25 (Table 6). The No Action ABC including discards is 37,903mt or about 83.5 million pounds. This default amount is lower than the proposed ABC by about 17,834 mt, or about 39 million pounds. The proposed ABC for FY2016 including discards is 55,737 mt or 123 million pounds. This increase is due to very large recruitment on both GB and MA in the last two years.

Although the impacts to ESA listed species under this alternative are somewhat uncertain, as a quantitative analysis has not been performed, the analyses have qualitatively considered how the fishery has operated in regards to listed species from 2012, when TDD regulations became effective (77 FR 20728, April 6, 2012) in the scallop fishery, resulting in dual requirements (TDD and chain mat) in the fishery to reduce serious injury and mortality to sea turtles, and NMFS issued a biological opinion (Opinion) on the scallop fishery in 2012 (NMFS 2012). The Opinion issued on July 12, 2012, included an incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles and Atlantic sturgeon. The sea scallop fishery is currently covered by the incidental take statement authorized in NMFS 2012 Opinion.

The 2012 Opinions for the sea scallop fishery concluded that the fishery may affect, but will not jeopardize the continued existence of any ESA listed species of sea turtles or Atlantic sturgeon (NMFS 2012). In 2011, pursuant to the reauthorization of the Magnuson Act, and thus, to date, total landings for the sea scallop fishery have increased, decreased, or remained stable. The ABC and OFL being proposed in the "No Action" are no greater than or are within the range of total landings that have been authorized by the fishery over the last 3 years (since 2012). As previously authorized ABC and OFL levels for the sea scallop fishery have not resulted in the exceedance of NMFS authorized take of any ESA listed species from 2012 to the present, the ABC and OFL levels for the fishery under No Action are not expected to result in the sea scallop fishery introducing any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date (NMFS 2012). As a result, the ABC and OFL under the "No Action" are not, as concluded in the NMFS 2012 Opinion, expected to result in levels of take that would jeopardize the continued existence of ESA listed species. For these reasons, and since this action would still require compliance with sea turtle chain mat and TDD regulations, the No Action would likely have neutral impacts on protected resources.

5.3.1.2 Alternative 2 - Updated OFL and ABC for FY2016 and FY2017 (default) (*Preferred Alternative*)

The values approved by the SSC are summarized in **Table 8** The updated ABC estimate including discards is 55,737 mt or 123 million pounds for FY2016, this is about 17,834 mt, or

about 39 million pounds higher than the No Action ABC (default). Updated survey results suggest an increase in biomass, primarily from above average recruitment throughout GB and the MA in 2014 and 2015. The projections for FY2017 suggest an even greater increase than 2016, but the SSC recommends the OFL and ABC remain at 2016 levels based on PDT input.

The proposed OFL and ABC are greater than the range of the ABC and OFL that have been authorized by the fishery over the last 3 years (since 2012). However, the allocations authorized to the fishery under these higher OFL/ABC values are no greater than or are within the range of catches that have been previously authorized by the fisher. Therefore, the proposed ABC and OFL levels in this alternative are not expected to results in the sea scallop fishery introducing any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date (NMFS 2012), since the fishery allocations are projected to result in actual landings much lower than these OFL and ABC limits. As a result, although Alternative 2 has the potential to increase interactions with protected species due to higher overall catch limits, the level of take is not expected to go beyond those that have been considered and authorized in NMFS 2012 Opinion (NMFS 2012) and therefore, as concluded in the 2012 Opinion, jeopardize the continued existence of any protected species. Based on this information, and the fact compliance with sea turtle chain mat and TDD regulations would still be required, Alternative 2 would likely result in low negative to neutral impacts to protected resources.

The No Action ABC is lower than the proposed ABC (Alternative 2) because biomass has increased based on updated survey results. However, the No Action ABC and the proposed ABC in FW27 are similar and not great enough to have direct impacts on the fishery since allocations and actual landings in the fishery are set well below these limits. Therefore, in general the potential impacts of the No Action ABC, as well as the updated ABC values under the preferred alternative are neutral and not expected to have direct impacts on protected resources since these measures are only legal limits and not tied directly to specific allocations that affect fishing effort. The proposed ABC may have low negative (if allowable catches actually set higher) impacts compared to No Action since the limit is higher, but in reality allocations are set well below these limits. Therefore, impacts are expected to be neutral. The direct impacts of the fishery allocations on protected resources are assessed in Section 5.2.2.1below.

5.3.2 Fishery specifications

5.3.2.1 Overall fishery allocations

Specification alternatives 1-5 are compared in terms of their impacts to protected resources using the projected bottom area swept values from the SAMS model simulations (see scallop resource impacts section for details). These area swept estimates are closely related to the LPUE estimates. Generally, scenarios with higher LPUE have lower area swept, and scenarios with lower LPUE have higher area swept.

The specifications under consideration in this action have estimates of area swept all below the overall estimates for the fishery in recent years. The range under consideration in this action is about 2,300 square nautical miles for No Action and up to 3,600 square nautical miles for Alternative 4 (ETA extension) (**Figure 55**). Framework 26 estimated total area swept to be about 2,300 square nautical miles in 2015, Framework 25 estimated about 2,800 square nautical miles in 2014, and Framework 24 estimated 2013 to be about 4,000 square nautical miles for under

proposed fishery specifications. Therefore, the range of total estimated area swept for the fishery in 2016 is similar to recent years, and has been declining overall under area rotation.

Alternative 1 (No Action – Default measures from Framework 26)

In the Scallop FMP, the No Action specifications for limited access vessels are 75% of the default DAS from the previous specifications framework, and the equivalent of one access area trip allocation. For general category vessels the default measures are closer to what their full fishing year allocation will likely be.

During 2016, the No Action has lower allocations and landings than the alternative specifications. As a result, 2016 effort and area swept would be lower under this alternative, as compared to any of the action alternatives. Specifically, the No Action alternative would have less effort in the Mid-Atlantic because there would be fewer access area trips allocated under this alternative, the equivalent of one LA trip compared to three trips per vessel under the action alternatives. Based on this information, the No Action is likely to have fewer potential interactions with sea turtles or Atlantic sturgeon relative to the alternative specifications. In regards to sea turtles, although loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada, in general, hard shelled species of sea turtles are most common in the Mid-Atlantic (i.e., south of Cape Cod, MA, See Section 4.3.1.1.1). As a result, sea turtle distribution commonly overlaps with the sea scallop fishery in Mid-Atlantic waters. In fact, estimated bycatch rates in trawl and dredge gear are higher in the Mid-Atlantic than in other waters in the affected environment (Murray 2011 and Warden 2011a). However, since the No Action will result in less effort relative to the action alternatives, and includes less overall effort allocations in MA access areas, the number of potential interactions with sea turtles is likely to be lower under this alternative.

In regards to Atlantic sturgeon, according to the NMFS 2012 Opinion, available information has shown no Atlantic sturgeon reported as caught in scallop dredge or in trawl gear where the haul target or trip target is scallop (NMFS 2012). Given the known capture of Atlantic sturgeon in trawl fisheries operating in the affected environment (Stein *et al*. 2004; ASMFC 2007; NEFSC 2011a), the NMFS 2012 Opinion concluded that it is reasonable to anticipate that some small level of bycatch may occur in the scallop trawl fishery; however, given the way that scallop dredges operate, the lack of documented interactions is likely reflective of a true lack of captures of Atlantic sturgeon in scallop dredge gear and therefore, Atlantic sturgeon interactions with dredge gear is not expected. As the sea scallop fishery is primarily executed with dredge gear (~95% of the fisheries fleet) and the No Action does not change the gear usage or usage rate in the fishery, interactions with Atlantic sturgeon are expected to be low, with or without any changes in effort.

Taking into consideration the above information, and the reasons provided in Section 5.1.2.1.5the No Action alternative is expected to have low positive to neutral impacts to protected species. Specifically, as the specifications authorized in the No Action are lower than or are within the range of specifications that have been authorized by the fishery over the last 3 years (since 2012), and previously authorized specifications for the sea scallop fishery have not resulted in the exceedance of NMFS authorized take of any ESA listed species from 2012 to the present, the No Action specifications are not expected to result in any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date (NMFS 2012). As a result, the specifications under the "No Action" are not, as concluded

in the 2012 Opinion, expected to result in levels of take that would jeopardize the continued existence of ESA listed species. For these reasons, and the fact that compliance with sea turtle chain mat and TDD regulations would still be required, the No Action would likely have low positive to neutral impacts on protected resources, even when compared to Alternatives 2-5.

Alternatives 2 - 5

Area swept estimates are discussed in the scallop resource impacts section (Section 5.1.2.1.5). All of the action alternative scenarios have similar area swept estimates during fishing years 2016 and 2017, with each action alternative showing an increase in effort in the MA, specifically in the MA access areas compared to No Action. Although this effort in MA access areas increases the potential for impacts on protected resources it does not extend beyond the range of effort or effects to protected species considered in the 2012 Biological Opinion. Further details are discussed below.

Alternative 2 is based on the general fishing target principles developed under the area rotation program adopted under Amendment 10, which does not include any adjustments to the access area boundaries as they currently exist. Because this alternative includes higher specifications (MA access area trips and higher DAS) this increase in effort has higher potential impacts to sea turtles or Atlantic sturgeon compared to No Action. As described above, within the scallop fishery area, sea turtles are most common in the Mid-Atlantic and in fact, estimated bycatch rates in trawl and dredge gear are higher in the Mid-Atlantic than in other waters in the affected environment (Murray 2011 and Warden 2011a). With increased effort under Alternative 2, in addition to trip allocations in MA access areas, the number of potential interactions with sea turtles may increase as compared to the No Action.

However, for the reasons described in the "No Action specification section," the specifications for Alternative 2, albeit higher than the No Action, are not such that levels of incidental take of protected resources are expected to go above and beyond that which has been considered and authorized by NMFS since 2012, and thus, above and beyond a level that, as concluded in the 2012 Opinion, could jeopardize the continued existence of listed species of sea turtles or Atlantic sturgeon (NMFS 2012). For these reasons, and the fact that the sea turtle chain mat and TDD regulations are in place during the months when turtles are present in the Mid-Atlantic, Alternative 2 is likely to have neutral impacts to protected resources. However, compared to the No Action, Alternative 2, with higher allocations and higher landings than the No Action specifications, would likely have low negative impacts to protected resources relative to the No Action. Albeit for different reasons, Alternative 2 will also have low positive impacts on protected resources relative to Alternative 3, 4, and 5 (see below for details). Compared to the preferred alternative (3a), Alternative 2 may have low positive impacts since 3a shifts LA trips from CA2 to MAAA instead. This additional effort in MAAA compared to the other action alternatives could increase the potential interactions with sea turtles, but the sea turtle chain mat and TDD regulations would still be in effect potentially reducing some of any potentially negative impacts of higher fishery allocations in that area.

Alternative 3 includes a new closed area south of CA2 with access for LA vessels in both MAAA and CA2. And Alternative 3a, the preferred alternative includes the same closure south of CA2, but also shifts LA CA2 trips to MAAA, the equivalent of about 2.2 million pounds of landings overall shifting from CA2 to MAAA. Closing the area on GB is expected to have neutral to low negative impacts on protected resources since sea turtles are less common on GB

and interactions are anticipated to be low. There may be some limited low negative impacts from effort shifting from that area on GB to areas and seasons with a higher potential for sea turtle interactions. However, these potential effects are very limited because both these alternatives include a reduction in overall DAS to compensate for the new closure.

Alternative 4 includes an expansion of the closure within ETA. The current closure as well as the expanded area overlap with turtle distributions off the coast of New Jersey. This expanded closure is expected to have neutral to low positive impacts on sea turtles. Impacts could be neutral because while an area would be closed with previously observed sea turtle takes, the same overall effort will be allocated to the fishery in Mid-Atlantic access areas, just restricted to areas outside of the proposed closures. Any shifts in effort would be minimal and occur in areas that are already subject to fishing by dredge or trawl gear and therefore, in areas which have been considered by NMFS in its assessment of fishery effects to protected resources (i.e. NMFS 2008; NMFS 2012).

However impacts Alternative 4 could also be low positive because the expanded closure is inshore of 60 meters and in general interaction rates of loggerhead turtles in commercial fishing gear tend to be higher in warm surface waters (>15C), depths <60m, and in regions of the southern Mid-Atlantic (<39N) depending on the time of year (Murray and Orphanides 2013, Murray 2011, Warden 2011a). Therefore, if effort that would have taken place in shallower portions of ETA (with potentially higher interactive rates) is shifted to deeper waters, there may be low positive impacts on sea turtles, depending on the season. If trips are taken outside the season when turtles are in the area, overall impacts of the closure would be neutral. For these reasons, as well as the reasons provided above for Alternative 2, Alternative 4 is likely to have low positive to neutral impacts to protected species. Compared to Alternative 2, 3 and 5, Alternative 4 would have more of a positive impact on protected species due to the expanded closure area in the ETA; however, compared to the No Action, Alternative 4 may have less of a positive impact on protected resources, at least in the short term (2016).

Alternative 5 has similar overall allocations as the other action alternatives, but spreads some of the access area effort into NL-north (about 1 million pounds). Thus overall there would be less effort allocated in MAAA under this alternative compared to Alternatives 2, 3, 3a, and 4. Less effort in MAAA could have low positive impacts on protected resource, but the total amount of effort shifted out of the MA is relatively small compared to the other alternatives.

Overall, more effort is expected in the Mid-Atlantic under all of the action alternatives under consideration compared to No Action; however, all action alternatives have similar or lower projected effort levels in the MAAA compared to FY2015 and overall. When total area swept is lower, fewer interactions with protected species are possible. In addition, for the reasons described in the "No Action specification" section, the specifications for Alternative 2-5, albeit higher than the No Action, are not such that levels of incidental take of protected resources are expected to go above and beyond that which has been considered and authorized by NMFS over the last 3 years, and thus, above and beyond a level that, as concluded in the 2012 Opinion, could jeopardize the continued existence of listed species of sea turtles or Atlantic sturgeon (NMFS 2012). For these reasons, and the fact that the sea turtle chain mat and TDD regulations are in place during the months when turtles are present in the Mid-Atlantic, overall, impacts to protected species from any of the alternatives are expected to be at minimum, neutral.

5.3.3 Allocation method for LA access areas

This action considered three alternatives for the method of allocating access areas to LA FT vessels: No Action (equal allocation per area); lottery allocation if NL is closed (lottery for the third trip in MAAA and CA2); and lottery allocation if NL is open to the LA fleet (lottery for the third trip in MAAA, CA2, and NL-north). No Action could have low negative impacts on protected resources because it would have more overall fishing in MAAA compared to the other alternatives that include lottery trips in GB access areas. Options 2 and 3 could have low positive impacts compared to No Action by shifting some effort out of MAAA where the potential for interactions with sea turtles is higher than on GB.

5.3.4 Allocation of LAGC IFQ trips in access areas

These options consider how to allocate access area trips to the LAGC fishery during 2016 (the preferred allocation option is Option 2), and in what areas (the preferred area option is Option 3). The options that allocate more access in MA access areas (Allocation Option 2, followed by Option 4, then Option 3, and finally Option 1) could increase effort in the Mid-Atlantic if vessels from ports farther north decide to relocate and fish those access areas instead of open areas farther north. This could have negative impacts on protected resources compared to alternatives that allocate less potential access in MA access areas. However, as noted in the scallop resource impacts section, if LAGC trips are not taken in the access areas, LAGC catch is assumed to come from open areas instead. This could result in lower or higher catch efficiency relative to the access area trips, depending on the open area fished and the resource conditions there.

Overall, LAGC effort in access areas is a small percentage of the overall catch and vessels tend to fish where catch rates are higher. Therefore, if catch rates are higher in access areas most trips are expected to be fished there, and if they are not higher, more LAGC catch is expected to come from open areas. This means that while the access area allocation options may increase flexibility for LAGC vessels in terms of where they can fish, it does not necessarily equate to a concentrated increase in effort in these access areas under any of the alternatives. As a result interactions with protected resources are possible under either scenario; however, the levels of potential take do not go beyond those that have been analyzed and authorized in the 2012 Biological Opinion (NMFS 2012) and therefore, as concluded in the 2012 Opinion, jeopardize the continued existence of any protected species. Based on this, and the fact the sea turtle chain mat and TDD regulations (for LAGC dredges greater than 10.5 feet) will be in place, impacts to protected resources (and the resource) are likely to be neutral for all options.

Option 1 (No Action) may have potentially low positive impacts on protected resources since it allocated the lowest level of access in MAAA and reduces the overall effort in the Mid-Atlantic and reduces incentive for vessels to fish in the MA from other areas with lower potential overlap with turtles (i.e. vessels from ports farther north). However, there are many LAGC vessels from the MA that would have to fish their quota exclusively from open areas if fewer trips were allocated in access areas. If open areas have lower catch rates compared to access areas there could be increased area swept for the same catch; this could increase the potential for an interaction with a protected resource. However, overall, as this is a relatively small fraction of the total effort expected in the MA for the total scallop fishery, any shifts in effort are expected to be minimal and therefore, elevated rates of listed species interactions are not expected. Based on this information, and the fact that sea turtle chain mat and TDD regulations (for LAGC dredge greater than 10.5 feet) will be in place, impacts to protected resources are likely to be neutral.

Area Options 2 and 3 could have low positive impacts on protected resources compared to Option 1 that keeps all LAGC effort in the MAAA. These options include some access in NL, an area that is expected to have less potential for interactions with protected species.

5.3.5 Additional measures to reduce impacts on small scallops

This action is considering three alternatives for this issue, in addition to the specific area closures considered in the overall specifications alternatives. Alternative 1(No Action) would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 is status quo related to RSA fishing, which allows compensation in any area open to the fishery. Finally, Alternative 3 would prohibit RSA compensation fishing in NL north, but allow it in any other area open to the fishery.

Under Alternative 1 RSA compensation fishing would be restricted to open areas only. This could have low positive to low negative impacts on protected resources depending on fishing behavior. There could be low positive impacts if vessels decide to harvest RSA from GB open areas where interactions with sea turtles is less likely. There could also be low negative impacts if vessels decide to fish in MA open areas and catch rates are lower there compared to MAAA, potentially increasing the time vessels fish to harvest compensation. Alternative 2 would allow RSA fishing in any are open to the fishery. Under the preferred alternative that would be open areas and MAAA. This alternative is expected to have neutral impacts on protected resources since vessels would have the flexibility to fish in any area open to the fishery already.

Alternative 3, prohibition on RSA fishing in NL may have neutral to low negative impacts on protected resources. If vessels are prohibited from fishing RSA compensation in NL they will have to fish that allocation in other areas open to the fishery (open areas or MAAA under the preferred specification alternative). Arguably, prohibiting fishing in NL could shift some portion of that effort into open areas in the MA or MAAA. More fishing in the MA could increase potential interactions with sea turtles and associated impacts. However, chances are vessels that were going to fish RSA in NL may choose to fish in open areas near that access area if that is near their homeports (i.e. New Bedford).

Overall impacts on protected resources are expected to be neutral from all these alternatives because the RSA compensation fishing effort is a relatively small proportion of overall scallop fishing effort, about 2.7% this fishing year (1.25 million pounds out of 47 million pounds).

5.4 ECONOMIC IMPACTS

The following sections analyze the economic impacts of the management alternatives considered in Framework 27 and compare these with two baselines, No Action alternative and Status Quo scenario. The objective of the cost-benefit analysis is to evaluate the net economic benefits arising from changes in consumer and producer benefits that are expected to occur with implementation of a regulatory action. As the NMFS Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) [11] state "the proper comparison is '*with the*

[11] Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007, http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf

action' to 'without the action' rather than to *'before and after the action,'* since certain changes may occur even without action and should not be attributed to the regulation." The guidelines also state that "No Action alternative does not necessarily mean a continuation of the present situation, but instead is the most likely scenario for the future, in the absence of other alternative actions"[12]. Even without action, the scallop stock abundance in open and access areas will be different, and as a result, landings, scallop prices, fishing costs, revenues and benefits from the fishery would change compared to the present levels. The Status Quo scenario as projected in this Framework action reflects this reality and, in addition to the No Action alternative, is used as one of the baselines to assess economic impacts of the proposed measures especially for the purposes of E.O.12866.

While NMFS 2007 guidelines indicate "The No Action alternative should be the basis of comparison for other alternatives", it very often use the terms "No Action" and "Status Quo" interchangeably[13]. The economic analyses presented in this section make a distinction in the definition of those terms, however, with "No Action" referring to a "regulatory" baseline and "Status Quo" referring to a state with no changes from the present allocations for open area DAS and access area trips. The definition of "No Action" as described in Section 2.2.1.1 of the document refers to the default measures that are specified in Framework 26 until the next Framework action is implemented. No Action alternative is used as one of the baselines for comparison of the biological and economic impacts of the proposed specification measures to those of default measures in accordance with the NMFS guidelines.

However, as discussed in detail in Section 5.4.2 below, default measures are temporary in nature and as such, allocations under those measures are usually set at considerably lower levels than the allocations either in the current (in 2015) or the projected allocations in the next fishing year (2016) to prevent fishing effort exceeding the sustainable levels due to the delays in the implementation of the proposed measures in next Framework Action. As a result, the projections for landings, revenues and economic benefits under the No Action alternative are considerably lower than the current levels and the levels that are expected under the proposed measures. Because of this, when economic benefits of the proposed alternatives are estimated using No Action as the baseline, the impacts on the economy are overstated in the short-term compared to the present circumstances.

OMB recommends using more than one baseline when the choice of baseline will significantly affect estimated benefits and costs. [14] For these reasons, the economic analyses in this framework also include a Status Quo scenario *(SQ)* to provide an assessment of how landings, revenues and total economic benefits from the scallop fishery would change if the current allocations were continued in 2015 but taking into account the impacts of projected changes in the productivity and the spatial distribution of the scallop resource on landings, revenues and total economic benefits. From that perspective, SQ is a more realistic baseline to assess the impacts of the

[12] Ibid, p.12

[13] For example, see p. 15 of 2007 NMFS guidelines: "For economic analysis of regulatory actions, changes in net benefits are measured by the difference in the present value of the discounted stream of net benefits of regulatory action, as compared to the status quo. In this context, a positive result means that the net present value of the regulatory action exceeds that of the status quo."

[14] Circular A-4, September 17, 2003, http://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf

proposed measures on the economy from the perspective of E.O.12866. Section 5.4.2 provides a description of the Status Quo scenario and discusses the implications of using the No Action and SQ scenarios as baselines to evaluate the economic benefits of the proposed measures.

As the Guidelines for Economic Analysis of Fishery Management Actions specify, "benefits and costs are measured from the perspective of the Nation, rather than from that of private firms or individuals. Benefits enjoyed by other nations are not included, although tax payments by foreign owners, and export revenues, are benefits to the Nation."

Because fishery management actions in general result in short-term costs for the industry in terms of foregone revenue, "choosing a period of analysis that is too short may bias the analysis toward costs, where costs are incurred in the short-term and benefits are realized later." Similarly, the Office of Management and Budget (OMB, 2003) indicated that the analyses should "present the annual time stream of benefits and costs expected to result from the rule," and state that "the beginning point for your stream of estimates should be the year in which the final rule will begin to have effects" and "the ending point should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule."[15] For these reasons, guidelines indicate that "a reasonable attempt should be made to conduct the analysis over a sufficient period of time to allow a consideration of all expected effects."

Furthermore, the economic impacts of the proposed regulations over the long-term should be evaluated by the discounted cumulative present value of the stream of benefits since benefits or costs that occur sooner are generally more valuable (or have a positive time preference). Discount rate is the interest rate used in calculating the present value of expected yearly benefits and costs.

This section examines the economic impacts of the proposed regulations in Framework 27. Although Framework 27 is a one year action, it will have impacts on the future yield from scallop resources, on scallop revenues and total economic benefits. The short- and the long-term economic impacts of the specification alternatives are analyzed in Section 5.4.2. The present value of long-term benefit and costs of the specification alternatives are estimated using both a 3% and a 7% discount rate. The higher discount rate provides a more conservative estimate and a lower bound for the economic benefits of alternatives compared with the benefits predicted using a lower discount rate.

5.4.1 Acceptable Biological Catch (Section 2.1.1)

5.4.1.1 No Action ABC

Reauthorization of the MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis. Under "No Action" for FY 2016, the overall ABC for each year would be identical to that of the default FY 2016 ABC for the fishery.

[15] OMB Circular A-4 (September 17, 2003), http://www.whitehouse.gov/omb/circulars_a004_a-4/

No Action ABC (31,807 mt.) is about 19% lower than the proposed ABC in this action because biomass has increased from 2015 levels. Therefore, the potential impacts of the No Action ABC on economic benefits are negative.

5.4.1.2 ABC for 2016 and default for 2017

The updated ABC estimates (37,852 mt.) for 2016 and the default values for 2017 are about 19% higher than the No Action default values because updated surveys suggest scallop biomass is higher than previous estimates. Overall, using these estimates to set fishery specifications should have positive economic impacts over the long-term because the ABC values were determined based on the recent surveys and best available science to prevent overfishing of the scallop resource.

5.4.2 Economic impacts of the Framework 27 specification alternatives

5.4.3.1 Proposed specification alternatives, No Action and Status quo

Framework 27 includes five allocation alternatives (ALT2, ALT3, ALT3A, ALT4, and ALT5) in addition to the "No Action" alternative (ALT1). The biological model projected landings, LPUE and size composition of landings for each of these alternatives for 2016-2029. These projections were then used as inputs in the economic model to estimate prices, revenues, costs, producer and consumer surpluses and total economic benefits from the scallop fishery. The impacts of alternatives on individual vessels are expected to be proportional to the aggregate impacts on revenues, fishing costs and net revenues (producer surplus).

Following the 2007 NMFS Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) [16], the biological and economic impacts of the proposed alternatives are compared in this Section to the "No Action" (i.e., temporary default measures) alternative as defined in Section 2.1.2.1 of the document. They were also compared to the projected economic impacts under the Status Quo alternative to provide a more realistic estimate of the impacts on the overall economy for the reasons explained below. Furthermore, those estimates were presented in the majority of Tables in 2015 dollars to provide insight for the managers and the industry participants about the impacts of the proposed measure relative to the current values. They were also summarized in terms of constant 2001 dollars to be consistent with the requested format in OMB Circular A-4 and in assessing the regulatory significance under E.O.12866.[17] See Table 78 and Table 80 for the estimates of revenues and net economic benefits of the proposed alternatives in terms of the 2001 constant dollars using the GDP deflator.

The definition of "No Action" in this document follows a regulatory approach and refers to the default measures specified in Framework 26 until the next Framework action is implemented in 2016. Default measures are designed to provide some level of fishing access at the start of a subsequent fishing year in the event that new fishery specifications are not in place. Therefore,

[16] Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007, http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf

[17] Page 32 of Circular A-4 (2003) states that: "In presenting the stream of benefits and costs, it is important to measure them in constant dollars to avoid the misleading effects of inflation in your estimates", and page 45 states that: "Please report all monetized effects in 2001 dollars. You should convert dollars expressed in different years to 2001 dollars using the GDP deflator".

the "No Action" alternative does not reflect, a "state" or baseline that correspond to the same amount of fishing effort in the current year (2015), but rather it provides a literal interpretation of "what is likely to occur" if there is a delay in the implementation of the new regulations. However, the default (the no action) measures are not intended to be in place for an entire fishing year without some sort of subsequent action.

Default measures are temporary in nature and as such, allocations under those measures are usually set at considerably lower levels than the allocations either in the current (in 2015) or the projected allocations in the next fishing year (2016) to prevent fishing effort exceeding the sustainable levels due to the delays in the implementation of the proposed measures in next Framework Action. For example, if No Action was taken in 2015, open area DAS allocations would equal 26 days-at-sea per full-time vessels, or 75% of the original projected allocations for 2015 (34 days). LA vessels would have some access in the MA access area, the equivalent of one 17,000 pound trip for FT vessels. However, the area would not open for new 2016 allocations until April 1, 2016.

As a result, total landings for No Action are estimated to be about 30.6 million lb. in 2016. This is about 8% less than the projected landings for the current fishing year (2015) and about 15% less than of the projected landings for some of the proposed alternatives in 2016 fishing year, resulting in considerably smaller revenues and economic benefits compared to the present circumstances as well as from the levels under the proposed alternatives. Conversely, when economic benefits of the proposed alternatives are estimated using No Action as the baseline, the impacts on the economy is overstated in the short-term compared to the current levels, since the No Action measures have been determined at very precautionary default levels, for a fraction of the year, and intended to be replaced with subsequent measures based on updated survey information.

As a result, economic comparisons based on the regulatory 'No Action' scenario (equivalent to the default measures) do not realistically reflect the expected impacts on the overall economy. OMB recommends using more than one baseline when the choice of baseline will significantly affect estimated benefits and costs.[18] For these reasons, the economic analyses provided for this framework also includes a Status Quo scenario (SQ) to reflect the changes in landings and economic benefits as a result of projected changes in the scallop resource stock and the composition of landings. In contrast to the "No Action" alternative that defines the baseline using a literal interpretation from regulatory perspective, the Status Quo (SQ) scenario provides a better assessment of what would happen in terms of landings, revenues and total economic benefits from the scallop fishery if the current level of allocations (in 2015) were continued in 2016 taking into account recent changes in the productivity and the spatial distribution of the scallop resource.

It is important to point out that SQ is not an alternative under consideration for selection in this action, but was developed by the PDT to reflect another baseline to be used to evaluate the economic impacts of the proposed alternatives if there were no changes in the allocations from

[18] Circular A-4, September 17, 2003, http://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf

the levels in 2016 fishing year. This baseline is more reflective of current fishing conditions since it includes a similar level of access to the fishery as in FY2015.

For the purposes of Framework 27 analyses, the projected economic benefits for alternatives will be compared both to the benefits for Status Quo and the No Action in Table 78, Table 79 and Table 80 below. The comparisons to No Action address estimated economic impacts of the proposed measures compared to the default measures set in Framework 26 using a literal interpretation of "what is likely to happen" if there is a delay in the implementation of new regulations" and comparisons to the SQ address the estimated economic impacts assuming the current allocations in the 2014 fishing year were continued in 2015 fishing year as well as to address the requirement for determining whether the proposed action qualify as a significant regulatory action.

5.4.3.2 Summary of the economic impacts of the proposed specification alternatives

The economic impacts of the proposed specification alternatives are summarized in Table 78 and Table 79 below both in 2015 and in 2001 constant dollars (for E.O.12866 purposes) compared to the No Action and Status Quo scenarios. Section 5.4.3.2.1 to 5.4.3.2.6 provide a summary of the economic impacts of each alternative separately, in terms of landings, revenues and total economic benefits (producer surplus plus consumer surplus). Section 5.4.3.3 to Section 5.4.3.7 present the detailed results by fishing year of economic impacts for landings, prices, effort, employment, trip costs, consumer and producer surpluses and total economic benefits. The impacts of a potential increase in mortality due to density dependence on economic benefits are analyzed in Section 5.4.3.9.

The economic impacts of the proposed alternatives are summarized in Table 78 to Table 81 below:

- Landings for all alternatives other than No Action, are estimated to exceed the SQ levels both in 2015 as well as over the long-term, (Table 83).

- All the proposed alternatives are expected to have positive economic impacts compared to the No Action and Status Quo both in the short- (2016) and the long-term (2016-2029).
- Alternative 4 (ETA Ext.) results in largest total economic benefits ($40.2 million compared to SQ) followed by Alternative 5 (NLS Acc., $39.6 million) and Alternative 2 ($37.6 million), and Alternative 3 ($21.7million) and preferred alternative 3A ($19.4 million) in 2016 fishing year (Table 78, in 2015 prices).

- Over the long-term from 2016-2029, cumulative present value of the total economic benefits are expected to be highest for Alternative 4 (ETA ext.) followed by Alternative 3 (CA2 ext.) and Alternative 5 and will be least for Alternative 2. However, preferred alternative will have negative long-term economic benefits compared to the status quo levels, and lowest benefits compared to all the other alternatives except for No Action. The ranking of alternatives in terms of long-term economic benefits are similar whether the present value of total economic benefits are estimated using a 7% or a 3% discount rate (Table 79, in 2015 prices).

- However, if high density in the access areas leads to higher mortality either in the short-term (scenario 2B) or in all years over the long-term (scenario 2A), landings, revenues and total economic benefits would be 7% (Scenario 2B) to 24% (scenario 2A) lower than the values shown Table 78 to Table 80 (Table 81). Impacts on of density dependence on landings by time period are shown in Section 5.4.3.9 and impacts on the long-term economic benefits are summarized in Table 82 below. Although density dependence would lower the economic benefits over the long-terms, it wouldn't affect the ranking of alternatives because benefits for all options would be reduced proportionally (Table 82, also see Section 5.4.3.9 for detailed Tables by year).

- Biological projections for the preferred alternative and alternative 5 with NLS access were also run incorporating potential impacts of highgrading on the scallop biomass and yield. The impacts on landings and economic benefits are slightly positive in 2016 due to higher prices for larger scallops, but, over the long-term landings and revenues would be lower. Highgrading would especially affect the long-term economic benefits for Alternative 5 (NLS acc.) since the NLS access area is abundant with small scallops according to the recent surveys. With high grading, Alternative 5 would result in negative economic benefits by $11.2 million net of status quo benefits (
- Table **103** in Section 5.4.3.8). Highgrading would also lower economic benefits under the preferred alternative over the long-term, but by a lesser amount compared to Alternative 5.

Table 78 - Economic Impacts for 2016: Estimated landings (Mill.lb.), revenues and economic benefits (Mill. $)

Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
FT LA Open area DAS	26	36.53	34.69	34.69	36.53	36.53	31
Total landings (Mill. lb.)	30.6	48.5	46.9	46.9	48.6	48.5	44.8
Difference from SQ	-14.2	3.7	2.1	2.1	3.8	3.7	
Difference from No Action		17.9	16.3	16.3	17.9	17.9	14.2
	In 2015 prices						
Total revenue (Mill. $)	379.3	555.5	540.5	538.7	557.6	557.1	519.3
Difference from No Action		176.2	161.2	159.4	178.2	177.8	140.0
Difference from SQ	-140.0	36.2	21.2	19.3	38.2	37.7	
Producer Surplus (Mill. $)	348.9	506.4	492.8	490.5	508.8	508.3	473.9
Difference from No Action		157.5	143.9	141.7	160.0	159.5	125.1
Difference from SQ	-125.1	32.4	18.8	16.6	34.9	34.4	
Total Economic Benefits (Mill. $)	366.1	545.1	529.2	526.9	547.7	547.1	507.5
Difference from No Action		179.0	163.2	160.8	181.6	181.0	141.4
Difference from SQ	-141.4	37.6	21.7	19.4	40.2	39.6	
	In 2001 Prices						
Total revenue (Mill. $)	287.3	420.8	409.5	408.1	422.4	422.0	393.4
Difference from No Action		133.5	122.1	120.7	135.0	134.7	106.1
Difference from SQ	-106.1	27.4	16.0	14.7	29.0	28.6	0.0
Producer Surplus (Mill. $)	264.3	383.6	373.3	371.6	385.5	385.1	359.0
Difference from No Action		119.3	109.0	107.3	121.2	120.8	94.8
Difference from SQ	-94.8	24.6	14.3	12.6	26.4	26.0	
Total Economic Benefits	277.3	413.0	400.9	399.2	415.0	414.5	384.5
Difference from No Action		135.6	123.6	121.8	137.6	137.1	107.1
Difference from SQ	-107.1	28.5	16.5	14.7	30.5	30.0	

Table 79 - Long-term Economic Impacts (2016-2029): Cumulative present value of revenues, producer surplus and total economic benefits *net of No action and net of Status quo* values (in 2015 dollars)

Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
Total landings (Mill. lb.)	1104.0	1106.3	1108.5	1102.2	1127.3	1106.5	1106.7
Difference from No Action		2.3	4.5	-1.8	23.3	2.5	2.7
Difference from SQ	-2.7	-0.4	1.8	-4.5	20.6	-0.2	
	At 3% discount rate						
Total revenue (Mill. $)	9414.4	9515.2	9512.8	9476.4	9633.4	9517.4	9501.5
Difference from No Action		100.8	98.4	62.0	219.0	103.0	87.1
Difference from SQ	-87.1	13.7	11.3	-25.1	131.9	16.0	
Producer Surplus (Mill. $)	8573.8	8667.5	8663.7	8627.4	8777.8	8669.8	8655.2
Difference from No Action		93.7	89.8	53.5	203.9	96.0	81.3
Difference from SQ	-81.3	12.4	8.5	-27.8	122.6	14.7	
Total Economic Benefits (Mill. $)	9794	9871	9876	9828	10022	9874	9863
Difference from No Action		77.1	82.5	33.8	228.4	79.9	69.4
Difference from SQ	-69.4	7.7	13.1	-35.6	159.0	10.5	
	At 7% discount rate						
Total revenue (Mill. $)	7628.1	7735.3	7734.9	7703.3	7821.4	7737.6	7719.5
Difference from No Action		107.1	106.8	75.2	193.3	109.4	91.3
Difference from SQ	-91.3	15.8	15.5	-16.2	102.0	18.1	
Producer Surplus (Mill. $)	6944.2	7043.2	7041.4	7009.5	7124.0	7045.5	7028.9
Difference from No Action		99.0	97.1	65.3	179.8	101.3	84.7
Difference from SQ	-84.7	14.3	12.4	-19.4	95.1	16.6	
Total Economic Benefits (Mill. $)	7961	8047	8054	8011	8159	8050	8036
Difference from No Action		85.7	93.0	49.6	198.0	88.6	75.3
Difference from SQ	-75.3	10.4	17.7	-25.7	122.8	13.3	

Table 80 - Long-term Economic Impacts(2016-2029): Cumulative present value of revenues and total economic benefits *net of No Action and net of Status Quo* values (in 2001 dollars)

Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
	At 3% discount rate						
Total revenue (Mill. $)	7132.1	7208.5	7206.7	7179.1	7298.0	7210.2	7198.1
Difference from No Action	0.0	76.4	74.6	47.0	165.9	78.1	66.0
Difference from SQ	-66.0	10.4	8.6	-19.0	99.9	12.1	
Producer Surplus (Mill. $)	6495.3	6566.3	6563.4	6535.9	6649.8	6568.0	6556.9
Difference from No Action	0.0	71.0	68.1	40.6	154.5	72.7	61.6
Difference from SQ	-61.6	9.4	6.5	-21.0	92.9	11.1	
Total Economic Benefits (Mill. $)	7419.6	7478.0	7482.1	7445.2	7592.6	7480.1	7472.1
Difference from No Action	0.0	58.4	62.5	25.6	173.0	60.5	52.6
Difference from SQ	-52.6	5.8	10.0	-27.0	120.5	8.0	
	At 7% discount rate						
Total revenue (Mill. $)	5778.9	5860.0	5859.8	5835.8	5925.3	5861.8	5848.1
Difference from No Action	0.0	81.1	80.9	56.9	146.4	82.9	69.2
Difference from SQ	-69.2	12.0	11.7	-12.2	77.2	13.7	0.0
Producer Surplus (Mill. $)	5260.8	5335.7	5334.4	5310.2	5397.0	5337.5	5324.9
Difference from No Action	0.0	75.0	73.6	49.5	136.2	76.8	64.2
Difference from SQ	-64.2	10.8	9.4	-14.7	72.0	12.6	0.0
Total Economic Benefits (Mill. $)	6031.0	6096.0	6101.5	6068.6	6181.1	6098.2	6088.1
Difference from No Action	0.0	64.9	70.4	37.6	150.0	67.1	57.0
Difference from SQ	-57.0	7.9	13.4	-19.5	93.0	10.1	0.0

Table 81 – The impacts of density dependency on landings and economic benefits (% Change from the base projections)

Period	Values	2A. Density Dependence (LT impact)	2B. Density dependence (ST impact)
2016	Landings (million lb.)	-1%	0%
	Revenue (million $)	-1%	1%
	Total economic benefits (mill. $)	-1%	1%
2017	Landings (million lb.)	-19%	-12%
	Revenue (million $)	-13%	-8%
	Total economic benefits (mill. $)	-15%	-9%
2018-2020	Landings (million lb.)	-36%	-17%
	Revenue (million $)	-23%	-10%
	Total economic benefits (mill. $)	-27%	-12%
2021-2029	Landings (million lb.)	-29%	-4%
	Revenue (million $)	-23%	-3%
	Total economic benefits (mill. $)	-26%	-4%
Landings (million lb.)		**-29%**	**-9%**
Revenue (million $)		**-20%**	**-6%**
Total economic benefits (mill. $)		**-24%**	**-7%**

Table 82 – The impacts of density dependency on the cumulative present value of total economic benefits over the long-term (2016-2029) using 7% discount rate

	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4. ETA ext.	5.NLS Acc.	SQ
	Density dependence – No impacts						
Total Economic Benefits (Mill. $)	7961	8047	8054	8011	8159	8050	8036
Difference from No Action		85.7	93.0	49.6	198.0	88.6	75.3
Difference from SQ	-75.3	10.4	17.7	-25.7	122.8	13.3	
	Density dependence – Long-term impacts (Scenario 2B)						
Total Economic Benefits (Mill. $)	7391	7487	7491	7451	7593	7490	7474
Difference from No Action	0	97	100	61	202	100	83
Difference from SQ	-83	13	17	-23	119	16	0
	Density dependence – Short-term impacts (Scenario 2A)						
Total Economic Benefits (Mill. $)	6041	6146	6149	6111	6224	6149	6130
Difference from No Action		105	108	70	182	107	89
Difference from SQ	-89	16	19	-19	94	19	

5.4.3.2.1 No Action – Default measures for 2016

The specifications would include default measures approved in Framework 26 for FY2016 which are 75% of the projected DAS for that year. As a result of fewer open area DAS (26 days instead of 31 days in 2015) and allocation of only one 17,000 pound trip for FT vessels, the landings are projected to be 30.6M lb., revenues are estimated to be $379.3 million, and total economic benefits are estimated to be $366.1 for No Action, much lower compared to the other alternatives in 2016 (Table 78). Over the long-term from 2016 to 2029, the present value of revenues, producer surplus and total economic benefits under No Action will be lower compared to all alternatives as well (Table 79).

5.4.3.2.2 Alternative 2 - Basic Run using fishing mortality target principles in the FMP with no modifications to scallop access area boundaries

Alternative 2 (ALT2) sets target catches using the three principles developed as part of the "hybrid" overfishing definition approved in Amendment 15, and not include additional closures or modifications to boundaries of the overall area rotation program.

This alternative would have short and long term positive economic impacts compared to the No Action and Status Quo scenarios. This alternative would result in higher landings (48.5M lb.), revenues ($555.5M), and total economic benefits ($545.1M) in 2016 compared to No Action. Over the long-term from 2016 to 2029, the present value of revenues, producer surplus and total economic benefits under this alternative would be higher than both from the No Action and the SQ scenarios (Table 78 and Table 79).

5.4.3.2.3 Alternative 3 – Basic run for specifications and additional closure south of CA2 to further protect small scallops

Under this alternative, vessels would have access into the current access area within CA2, but the current open area south of the access area would be closed to all fishing. ALT3 would have short and long term positive economic impacts compared to both No Action, and the SQ scenario because it would allocate more open area DAS than No Action and similar to ALT2, and each LA FT vessel would be allocated 51,000 pounds to Mid-Atlantic Access Areas and Closed Area 2. Although this alternative would have positive economic impacts both in 2016 and over the long-term compared to the No Action and SQ scenarios, the level of benefits would be about $20 million lower than ALT2, ALT4 and ALT5 in the short-term (Table 78). However, Alt.3 would have slightly higher economic benefits over the long-term compared to Alt.2 and Alt.5 but lower than compared to Alt.4 (Table 79).

5.4.3.2.4 Alternative 3a – Basic run with CA2 south extension and no access in CA2 (preferred alternative)

This alternative is similar to Alternative 3, except LA vessels would not be allocated trips in CA2 south. Instead, those trips would be shifted to MAAA with the inshore portion of ETA closed, CA1 and CA2 access areas closed, and NL-north open to LAGC vessels only. Similar to the other alternatives, each LA FT vessel would be allocated 51,000 pounds in MAAA. Revenues, producer surplus and total economic benefits for ALT3A would exceed the No Action and Status Quo levels in 2016, but would be lower than compared to the other alternatives. However, present value of the cumulative revenues, producer surplus and total economic benefits would be negative under ALT3A over the long-term from 2016 to 2029 compared to the status quo values and would again be lower compared to the other alternatives except for the No Action scenario. Overall, the net economic benefits of the preferred alternative (Alt3A. CA ext.) would be about $25.7 million lower than status quo benefits, and with highgrading, it would be about $28.1 million lower using a 7% discount rate. If the long-term benefits were discounted less using a 3% rate, than the long-term economic benefits would be even lower compared to status levels, by $35.6 million with no highgrading and by $38.4 million with highgrading (Table **103**, Section 5.4.3.8). The impacts of providing access to IFQ vessels for NL North is analyzed in 5.4.3.12 in connection with the area access options for the LAGC fishery.

5.4.3.2.5 Alternative 4 – Basic run for specifications and expanded closure of ETA closed to further protect small scallops

Because this alternative would provide 36.53 open area days and allocate 51,000 pounds trips per FT vessels to the Mid-Atlantic Access Areas and Closed Area 2, it would have short- and long-term positive economic impacts compared to the No Action and SQ scenarios. Revenues, producer surplus and total economic benefits for ALT4 would exceed the No Action and Status Quo levels over the long term as well. This alternative will also have the largest economic benefits both in the short- and the long-term compared to the other alternatives.

5.4.3.2.6 Alternative 5 – Basic run for specifications and include limited allocation of effort in northern part of Nantucket Lightship Access Area

This alternative considers a limited amount of effort to a portion of the NL access area expected to have lower densities of small scallops. Each LA FT vessels would be allocated 51,000 pounds, 20,400 pounds for PT and 4,080 pounds for occasional vessels. All other access areas would be closed to the fishery under this alternative. Revenues, producer surplus and total economic benefits for ALT5 would exceed the No Action and Status Quo levels over the long

term as well. Short-term economic benefits for this action will be similar to the levels for other alternatives. Over the long-term, this alternative will have the smallest economic benefits compared to the other alternatives.

However, NLS area is more prone to highgrading compared to the other areas due to potentially large numbers of small scallops in this area. For this reason, the PDT ran another scenario for this alternative to measure likely impacts of highgrading on economic benefits. As Table **103** (Section 5.4.3.8) showed, highgrading would reduce the economic benefits of this alternative over the long-term. In fact, with highgrading, cumulative present value of the revenues and economic benefits from 2016 to 2029 would be lower for ALT5 than the levels for all other alternatives including ALT2, ALT3 and ALT4.

5.4.3.2.7 Impacts of the specification alternatives on the LAGC IFQ fishery

On March 1, 2016 LAGC vessels will be allocated an individual quota based on default measures that will likely be different than the allocation LAGC IFQ vessels will ultimately be allocated under FW27. Under FY2016 default measures the LAGC IFQ allocation is 3,745,615 lb. for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit, which is about 16% less than what would be allocated under the preferred (ALT3A) and other alternatives. Therefore, the No action would have negative impacts on LAGC IFQ vessels compared to the alternatives 2 to 5.

Under all alternatives (ALT2, ALT3, ALT3A, ALT4 and ALT5), allocation for the LAGC IFQ fishery including the LA vessels with IFQ permits will be 4,473,180 lb. , which is about 16% higher than the allocation compared to No Action. Allocation would also be about 50% higher compared to the status quo allocation for 2015 (2,971,800 lb.) As a result, the economic impacts of the preferred and other alternatives on the LAGC IFQ fishery is expected to be positive compared to both No Action and the Status Quo scenarios.

No action for the NGOM hard TAC is 70,000 pounds and the target TAC for vessels with a LAGC Incidental permit is 50,000 pounds, which is equivalent under all alternatives. Therefore, the economic impacts on the vessels with NGOM and incidental permits will be neutral.

5.4.3.2.8 Default measures for 2017 (preferred alternative)

Each specification alternative also includes default measures for 2017 fishing year until the next framework action is implemented. Under those measures, LA vessels would be allocated a reduced level of open area DAS (set at 75% of the projected DAS allocation for 2017). The PDT discussed that Amendment 19 is considering measures to better streamline the specifications process. Therefore, the length of time that default measures are in place overall should be reduced. The current estimate of implementation for specifications, assuming Amendment 19 is approved as proposed, would be April 1. For these reasons, PDT recommendation does not include access area allocations as a default measure in 2017.

The default measures allow reduced levels of access to the fishery at the start of the year with the intent that additional allocations are provided later in the fishing year under a subsequent action. Because these measures are expected to prevent fishing effort exceeding the sustainable levels and the potentially negative impacts on the resource and scallop yield until the next Framework Action is in place, they will have positive economic benefits for the scallop fishery in the long-term.

The following sections describes the detailed results of the proposed options on landings, effort, prices, revenues, producer and consumer surpluses and total economic benefits annually (for 2016 and beyond) and also for distinct periods including short-term and long-term (2016 to 2029) for all alternatives.

5.4.3.3 Impacts on Landings, Price and Revenue

Landings for all alternatives other than No Action, are estimated to exceed the SQ levels both in 2016. These estimates are based on the biological projections assuming that the size distribution of landings will reflect the composition of the exploitable biomass in the access areas. However, given that economic incentives for highgrading increased recently due to the widening of price differentials between the large (U10s and U12s) and smaller sizes, two scenarios were run with potential highgrading under the preferred alternative (ALT3A) and alternative 5 (ALT5 NLS access). The economic impacts of those scenarios are analyzed in Section 5.4.3.8.

Table 83 - Estimated landings (Million lb.) (Estimated landings in 2015, 40 to 41 mill.lb.)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016-2017	2016	30.6	48.5	46.9	46.9	48.6	48.5	44.8
	2017	87.9	82.9	84.1	81.5	78.3	83.1	84.4
2016-2017 Total		**118.5**	**131.5**	**131.0**	**128.5**	**126.9**	**131.6**	**129.2**
2018-2020	2018	118.1	114.1	118.7	112.6	115.6	114.2	115.2
	2019	135.7	131.9	131.3	132.7	131.8	131.9	132.9
	2020	116.4	114.8	115.9	118.1	121.2	114.9	114.9
2018-2020 Total		**370.2**	**360.8**	**366.0**	**363.4**	**368.6**	**360.9**	**363.0**
2021-2029	2021	95.5	94.8	94.5	95.4	99.1	94.8	95.0
	2022	77.9	77.6	77.1	77.5	80.4	77.6	77.7
	2023	68.2	68.0	67.5	67.9	69.8	68.0	68.1
	2024	63.1	63.0	62.5	63.1	64.6	63.0	63.0
	2025	61.2	61.1	60.8	61.3	62.8	61.1	61.2
	2026	61.6	61.6	61.4	60.8	62.7	61.6	61.7
	2027	62.0	62.0	61.9	60.7	62.9	62.0	62.1
	2028	60.8	60.9	60.8	61.0	63.6	60.9	60.9
	2029	64.9	65.0	64.9	62.6	65.8	65.0	65.0
2021-2029 Total		**615.3**	**614.0**	**611.5**	**610.4**	**631.9**	**614.0**	**614.5**
Grand Total		**1104.0**	**1106.3**	**1108.5**	**1102.2**	**1127.3**	**1106.5**	**1106.7**

Table 84 - Estimated landings net of SQ Action levels (Million lb.)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext	4.ETA ext.	5.NLS Acc.
2016-2017	2016	-14.2	3.7	2.1	2.1	3.8	3.7
	2017	3.5	-1.4	-0.3	-2.8	-6.1	-1.3
2016-2017 Total		**-10.7**	**2.3**	**1.8**	**-0.7**	**-2.3**	**2.5**
2018-2020	2018	2.9	-1.1	3.5	-2.6	0.3	-1.1
	2019	2.8	-1.0	-1.6	-0.2	-1.1	-1.0
	2020	1.6	-0.1	1.0	3.2	6.4	0.0
2018-2020 Total		**7.2**	**-2.2**	**2.9**	**0.3**	**5.5**	**-2.1**
2021-2029	2021	0.6	-0.1	-0.5	0.5	4.2	-0.1
	2022	0.2	-0.1	-0.6	-0.2	2.7	-0.1
	2023	0.1	-0.1	-0.6	-0.2	1.8	-0.1
	2024	0.0	-0.1	-0.5	0.1	1.6	-0.1
	2025	0.0	0.0	-0.4	0.2	1.7	-0.1
	2026	0.0	0.0	-0.2	-0.9	1.0	0.0
	2027	0.0	0.0	-0.1	-1.4	0.9	0.0
	2028	0.0	0.0	-0.1	0.2	2.7	0.0
	2029	0.0	0.0	0.0	-2.4	0.9	0.0
2021-2029 Total		**0.8**	**-0.5**	**-3.0**	**-4.1**	**17.4**	**-0.6**
Grand Total		**-2.7**	**-0.4**	**1.8**	**-4.5**	**20.6**	**-0.2**

Prices are estimated using the ex-vessel price model that takes into account the impacts of changes in meat count, domestic landings, exports, import prices, income of consumers, and composition of landings by market category (i.e., size of scallops). The price estimates shown in Table 7 correspond to the price model outputs assuming that the import prices will be constant at

their 2015 levels, scallop exports will constitute about 40% of the domestic landings (average ratio for 2011-2013 fishing years), and the disposable income will be constant at the current levels in 2015, so that only the effects of the reduction in and changes in the size composition of landings could be identified. In addition, price estimates reflect real (as opposed to nominal) prices since they are expressed in 2015 constant prices assuming inflation will be zero in the future years. Therefore, actual real or nominal prices could be higher (lower) than the values estimated in Table 7 if the import prices, exports and disposable income increase (decrease) in the future years. Nominal prices will probably higher in the future as well since it is unusual for the inflation to remain at zero.

The price estimates are also based on the size composition of landings estimated by the biological projections for each alternative shown in Table 85. If the projections underestimate the proportion of U10 landings, for example, as was the case in recent years, then estimated prices would be lower than actual prices in 2016. The lumping of 12 count scallops in the dealer data with the broader size category of 10-20 count scallops lower the accuracy of the price estimates because those scallops usually are sold at a higher price than 15 or 20 count scallops. These factors affect the absolute values of the revenue and total economic benefit estimates of the proposed alternatives as well.

Table 85 – Composition of landings by size category according to the biological projections for 2016.

Size category	2. Basic Run	3. CA2 ext.	Preferred 3A. CA2 ext.	5.NLS Acc.	SQ
U10	2.7%	2.8%	2.6%	3.3%	2.2%
10-20	60.9%	60.2%	59.0%	61.1%	60.1%
20-30	33.5%	34.1%	35.2%	32.9%	34.5%
30-40	2.8%	2.9%	3.2%	2.7%	3.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Although the absolute values for revenues, producer and consumer surpluses, and total economic benefits would change with the value of estimated prices, the percentage differences of these values for alternatives 2 to 5 relative to the No Action or Status Quo scenarios would not change in any substantial way. Higher prices than estimated in Table 7 will increase the short-term positive impact of all the alternatives on revenues compared to No Action, while lower prices reduce this impact. The long-term benefits will be greater with higher prices and smaller with lower prices, however.

Table 86 - Estimated ex-vessel prices (in 2015 inflation adjusted prices)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016-2017	2016	12.4	11.4	11.5	11.5	11.5	11.5	11.6
	2017	10.0	10.2	10.1	10.2	10.4	10.2	10.1
2016-2017 Average		**11.2**	**10.8**	**10.8**	**10.9**	**10.9**	**10.8**	**10.9**
2018-2020	2018	8.9	9.1	8.9	9.1	9.0	9.1	9.0
	2019	8.3	8.4	8.4	8.4	8.4	8.4	8.4
	2020	9.0	9.1	9.1	9.0	8.9	9.1	9.1
2018-2020 Average		**8.7**	**8.9**	**8.8**	**8.8**	**8.8**	**8.9**	**8.8**
2021-2029	2021	10.0	10.0	10.0	10.0	9.8	10.0	10.0
	2022	10.7	10.7	10.8	10.7	10.6	10.7	10.7
	2023	11.1	11.1	11.1	11.1	11.0	11.1	11.1
	2024	11.3	11.3	11.3	11.3	11.2	11.3	11.3
	2025	11.4	11.4	11.4	11.3	11.3	11.4	11.4
	2026	11.3	11.3	11.3	11.3	11.3	11.3	11.3
	2027	11.3	11.3	11.3	11.4	11.2	11.3	11.3
	2028	11.3	11.3	11.3	11.3	11.2	11.3	11.3
	2029	11.1	11.1	11.1	11.2	11.1	11.1	11.1
2021-2029 Average		**11.1**	**11.1**	**11.1**	**11.1**	**11.0**	**11.1**	**11.1**
2016-2029 Average		**10.6**	**10.6**	**10.5**	**10.6**	**10.5**	**10.6**	**10.6**

Table 87. Present value of total scallop revenue (Million $, using 3% discount rate, in 2015 inflation adjusted prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Revenue	379.3	555.5	540.5	538.7	557.6	557.1	519.3
	Revenue net of SQ	-140.0	36.2	21.2	19.3	38.2	37.7	
	Revenue net of No Action		176.2	161.2	159.4	178.2	177.8	140.0
2017	Revenue	849.7	818.5	825.4	809.3	790.8	819.6	828.2
	Revenue net of SQ	21.5	-9.6	-2.8	-18.8	-37.3	-8.6	
	Revenue net of No Action		-31.2	-24.3	-40.4	-58.9	-30.1	-21.5
2018-2020	Revenue	2954.3	2918.1	2940.6	2926.2	2951.6	2918.3	2927.3
	Revenue net of SQ	27.1	-9.2	13.4	-1.0	24.3	-9.0	
	Revenue net of No Action		-36.2	-13.7	-28.1	-2.8	-36.0	-27.1
2021-2029	Revenue	5231.0	5223.0	5206.3	5202.2	5333.4	5222.4	5226.7
	Revenue net of SQ	4.3	-3.7	-20.4	-24.5	106.7	-4.3	
	Revenue net of No Action		-8.0	-24.7	-28.9	102.4	-8.6	-4.3
Revenue		**9414.4**	**9515.2**	**9512.8**	**9476.4**	**9633.4**	**9517.4**	**9501.5**
Revenue net of SQ		**-87.1**	**13.7**	**11.3**	**-25.1**	**131.9**	**16.0**	
Revenue net of No Action			**100.8**	**98.4**	**62.0**	**219.0**	**103.0**	**87.1**

Table 88 - Present value of total scallop revenue (Million $, using 7% discount rate)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Revenue	379.3	555.5	540.5	538.7	557.6	557.1	519.3
	Revenue net of SQ	-140.0	36.2	21.2	19.3	38.2	37.7	
	Revenue net of No Action		176.2	161.2	159.4	178.2	177.8	140.0
2017	Revenue	817.9	787.9	794.5	779.1	761.3	789.0	797.2
	Revenue net of SQ	20.7	-9.3	-2.7	-18.1	-35.9	-8.3	
	Revenue net of No Action		-30.0	-23.4	-38.9	-56.7	-29.0	-20.7
2018-2020	Revenue	2638.4	2605.7	2626.3	2612.3	2635.0	2605.9	2614.0
	Revenue net of SQ	24.3	-8.3	12.3	-1.8	20.9	-8.1	
	Revenue net of No Action		-32.7	-12.0	-26.1	-3.4	-32.5	-24.3
2021-2029	Revenue	3792.5	3786.1	3773.6	3773.3	3867.6	3785.7	3788.9
	Revenue net of SQ	3.6	-2.8	-15.3	-15.6	78.7	-3.2	
	Revenue net of No Action		-6.4	-19.0	-19.2	75.1	-6.9	-3.6
Revenue		**7628.1**	**7735.3**	**7734.9**	**7703.3**	**7821.4**	**7737.6**	**7719.5**
Revenue net of SQ		**-91.3**	**15.8**	**15.5**	**-16.2**	**102.0**	**18.1**	
Revenue net of No Action			**107.1**	**106.8**	**75.2**	**193.3**	**109.4**	**91.3**

5.4.3.4 Impacts of Framework 27 specification alternatives on DAS, fishing costs and open area days and employment

Total effort measured in terms of DAS used as a sum total of all areas will be higher in the short-term for all the alternatives compared to No Action because No Action alternative would fewer DAS and access trips. Employment level in the scallop fishery as measured by CREW*DAS will be higher under all alternatives compared to No Action (ALT1) as well.

Present value of the fleet costs are summarized in Table 92 using a discount rate of 3% and in Table 93 using a discount rate of 7%. In general, the differences in the cumulative present value of the trip costs are quite low, amounting to a couple of million $ for over 15 years.

Table 89 - Open area DAS per limited access vessel (average per year)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016-2017	2016	26	36.53	34.69	34.69	36.53	36.53	31
	2017	52.0	47.0	49.0	45.0	47.0	47.0	48.0
2016-2017 Total		**39.0**	**41.5**	**42.0**	**40.0**	**41.5**	**41.5**	**39.5**
2018-2020	2018	54.0	49.0	52.0	46.0	49.0	49.0	50.0
	2019	122.0	112.0	112.0	118.0	101.0	112.0	112.0
	2020	108.0	103.0	103.0	105.0	112.0	103.0	103.0
2018-2020 Total		**94.7**	**88.0**	**89.0**	**89.7**	**87.3**	**88.0**	**88.3**
2021-2029	2021	84.0	81.0	82.0	82.0	84.0	81.0	81.0
	2022	72.0	70.0	70.0	70.0	72.0	70.0	70.0
	2023	66.0	65.0	65.0	65.0	67.0	65.0	65.0
	2024	63.0	62.0	62.0	62.0	64.0	62.0	62.0
	2025	62.0	61.0	61.0	62.0	63.0	61.0	61.0
	2026	63.0	63.0	63.0	62.0	64.0	63.0	63.0
	2027	64.0	64.0	64.0	62.0	64.0	64.0	64.0
	2028	64.0	63.0	63.0	63.0	66.0	63.0	63.0
	2029	69.0	69.0	69.0	65.0	68.0	69.0	69.0
2021-2029 Total		**67.4**	**66.4**	**66.6**	**65.9**	**68.0**	**66.4**	**66.4**
Grand Total		**69.2**	**67.5**	**67.9**	**67.3**	**68.4**	**67.5**	**67.3**

Table 90 - Total DAS (sum of open and access areas)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016-2017	2,016	12,813	20,674	20,092	20,266	20,507	20,516	19,100
	2,017	32,320	30,774	31,359	30,312	29,000	30,838	31,159
2016-2017 Total		**45,133**	**51,448**	**51,451**	**50,578**	**49,507**	**51,354**	**50,259**
2018-2020	2,018	40,689	39,487	40,937	39,031	39,693	39,510	39,771
	2,019	52,972	51,538	50,625	53,903	50,050	51,556	51,783
	2,020	41,249	40,667	41,177	41,488	43,786	40,702	40,724
2018-2020 Total		**134,910**	**131,692**	**132,739**	**134,422**	**133,529**	**131,768**	**132,278**
2021-2029	2,021	33,096	32,858	32,895	33,035	33,833	32,871	32,895
	2,022	28,753	28,640	28,607	28,686	29,375	28,645	28,666
	2,023	26,492	26,433	26,315	26,480	27,017	26,435	26,451
	2,024	25,187	25,153	25,031	25,332	25,762	25,154	25,167
	2,025	24,765	24,746	24,657	24,963	25,426	24,746	24,755
	2,026	25,199	25,188	25,131	24,896	25,518	25,188	25,195
	2,027	25,477	25,471	25,432	24,822	25,517	25,471	25,476
	2,028	25,099	25,096	25,074	25,095	25,928	25,095	25,099
	2,029	26,922	26,920	26,905	25,616	26,672	26,919	26,922
2021-2029 Total		**240,990**	**240,505**	**240,047**	**238,925**	**245,048**	**240,524**	**240,626**
Grand Total		**421,033**	**423,645**	**424,237**	**423,925**	**428,084**	**423,646**	**423,163**

Table 91 - Percentage increase in total DAS compared to No Action and SQ DAS (Sum of open and access areas)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Total DAS	12,813	20,674	20,092	20,266	20,507	20,516	19,100
	DAS net of SQ	-32.9%	8.2%	5.2%	6.1%	7.4%	7.4%	
	DAS net of No Action		61.4%	56.8%	58.2%	60.0%	60.1%	49.1%
2017	Total DAS	32,320	30,774	31,359	30,312	29,000	30,838	31,159
	DAS net of SQ	3.7%	-1.2%	0.6%	-2.7%	-6.9%	-1.0%	
	DAS net of No Action		-4.8%	-3.0%	-6.2%	-10.3%	-4.6%	-3.6%
2018-2020	Total DAS	134,910	131,692	132,739	134,422	133,529	131,768	132,278
	DAS net of SQ	2.0%	-0.4%	0.3%	1.6%	0.9%	-0.4%	
	DAS net of No Action		-2.4%	-1.6%	-0.4%	-1.0%	-2.3%	-2.0%
2021-2029	Total DAS	240,990	240,505	240,047	238,925	245,048	240,524	240,626
	DAS net of SQ	0.2%	-0.1%	-0.2%	-0.7%	1.8%	0.0%	
	DAS net of No Action		-0.2%	-0.4%	-0.9%	1.7%	-0.2%	-0.2%
Total DAS		**421,033**	**423,645**	**424,237**	**423,925**	**428,084**	**423,646**	**423,163**
DAS net of SQ		**-0.5%**	**0.1%**	**0.3%**	**0.2%**	**1.2%**	**0.1%**	
DAS net of No Action			**0.6%**	**0.8%**	**0.7%**	**1.7%**	**0.6%**	**0.5%**

Table 92 - Present value of cumulative trip costs (in 2015 inflation adjusted values prices, at 3% discount rate, $ Million)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Total trip costs	30.4	49.1	47.7	48.1	48.7	48.7	45.4
	Trip costs net of SQ	-14.9	3.7	2.4	2.8	3.3	3.4	
2017	Total trip costs	74.5	71.0	72.3	69.9	66.9	71.1	71.9
	Trip costs net of SQ	2.7	-0.9	0.5	-2.0	-5.0	-0.7	
2018-2020	Total trip costs	293.4	286.3	288.7	292.2	290.1	286.5	287.6
	Trip costs net of SQ	5.7	-1.3	1.0	4.6	2.5	-1.1	
2021-2029	Total trip costs	442.2	441.2	440.4	438.8	449.8	441.3	441.5
	Trip costs net of SQ	0.7	-0.2	-1.1	-2.7	8.4	-0.2	
Total trip costs		**840.5**	**847.6**	**849.1**	**849.0**	**855.6**	**847.6**	**846.3**
Trip costs net of SQ		**-5.8**	**1.3**	**2.8**	**2.7**	**9.3**	**1.3**	

Table 93 - Present value of cumulative trip costs (in 2015 inflation adjusted values prices, at 7% discount rate, $ Million)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Total trip costs	30.4	49.1	47.7	48.1	48.7	48.7	45.4
	Trip costs net of SQ	-14.9	3.7	2.4	2.8	3.3	3.4	
2017	Total trip costs	71.8	68.3	69.6	67.3	64.4	68.5	69.2
	Trip costs net of SQ	2.6	-0.9	0.4	-1.9	-4.8	-0.7	
2018-2020	Total trip costs	261.9	255.6	257.8	260.7	258.8	255.7	256.8
	Trip costs net of SQ	5.2	-1.2	1.0	4.0	2.0	-1.0	
2021-2029	Total trip costs	319.8	319.0	318.4	317.6	325.5	319.1	319.2
	Trip costs net of SQ	0.6	-0.2	-0.8	-1.6	6.3	-0.1	
Total trip costs		**683.9**	**692.1**	**693.6**	**693.8**	**697.4**	**692.0**	**690.5**
Trip costs net of SQ		**-6.6**	**1.5**	**3.0**	**3.3**	**6.9**	**1.5**	

5.4.3.5 Present Value of Producer Surplus

Producer surplus (benefits) for a particular fishery shows the net benefits to harvesters, including vessel owners and crew, and is measured by the difference between total revenue and operating costs. Producer benefits of all the alternatives with the exception of No Action will be higher than SQ benefits in the short-term. Over the long-term, cumulative present value of the preferred alternative (Alt.3A) will be lower than the SQ benefits by $27.7 million ($19.4 million) using 3% (7%) discount rate, while the benefits for all the other alternatives (except for No Ac6tion) will exceed the Status levels.

Table 94 - Present value of producer surplus (using 3% discount rate, Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Producer surplus	348.9	506.4	492.8	490.51	508.8	508.3	473.9
	PS net of SQ	-125.1	32.4	18.8	16.57	34.9	34.4	
2017	Producer surplus	775.2	747.6	753.0	739.42	723.9	748.5	756.3
	PS net of SQ	18.9	-8.7	-3.3	-16.89	-32.4	-7.8	
2018-2020	Producer surplus	2661.0	2631.8	2652.0	2634.05	2661.4	2631.8	2639.7
	PS net of SQ	21.3	-7.9	12.3	-5.61	21.8	-7.8	
2021-2029	Producer surplus	4788.9	4781.8	4765.9	4763.42	4883.6	4781.2	4785.2
	PS net of SQ	3.6	-3.4	-19.3	-21.83	98.3	-4.1	
Producer surplus		**8573.8**	**8667.5**	**8663.7**	**8627.39**	**8777.8**	**8669.8**	**8655.2**
PS net of SQ		**-81.3**	**12.4**	**8.5**	**-27.76**	**122.6**	**14.7**	

Table 95 - Present value of producer surplus (using 7% discount rate, Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Producer surplus	348.9	506.4	492.8	490.51	508.8	508.3	473.9
	PS net of SQ	-125.1	32.4	18.8	16.57	34.9	34.4	
2017	Producer surplus	746.2	719.6	724.9	711.78	696.9	720.5	728.0
	PS net of SQ	18.2	-8.4	-3.1	-16.25	-31.2	-7.5	
2018-2020	Producer surplus	2376.5	2350.1	2368.6	2351.56	2376.2	2350.2	2357.3
	PS net of SQ	19.2	-7.2	11.3	-5.72	18.9	-7.1	
2021-2029	Producer surplus	3472.7	3467.1	3455.1	3455.64	3542.1	3466.6	3469.7
	PS net of SQ	3.1	-2.6	-14.5	-14.02	72.4	-3.1	
Producer surplus		**6944.2**	**7043.2**	**7041.4**	**7009.49**	**7124.0**	**7045.5**	**7028.9**
PS net of SQ		**-84.7**	**14.3**	**12.4**	**-19.43**	**95.1**	**16.6**	

5.4.3.6 Present Value of Consumer Surplus

Consumer surplus for a particular fishery is the net benefit that consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or the amount of fish harvested goes up. Present value of the consumer surplus are shown in Table 22 (using a 3% discount rate) and Table 24 (using a 7% discount rate), and the cumulative present values net of Status Quo levels are summarized in Table 23 and Table 25. Consumer benefits of all the alternatives with the exception of No Action alternative will be higher than SQ benefits in the short-term. Over the long-term, cumulative present value of the preferred alternative (Alt. 3A) will be lower than the SQ benefits slightly by $7.8 million ($6.3 million) using 3% (7%) discount rate, while the benefits for all the other alternatives (except for No Ac6tion) will exceed the Status levels.

Table 96 - Present value of consumer surplus (CS) using 3 % discount rate (Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Consumer surplus	17.2	38.7	36.5	36.38	38.9	38.8	33.6
	CS net of SQ	-16.3	5.2	2.9	2.81	5.3	5.2	
2017	Consumer surplus	108.6	97.9	100.3	94.95	88.7	98.3	101.0
	CS net of SQ	7.6	-3.1	-0.7	-6.03	-12.3	-2.6	
2018-2020	Consumer surplus	570.0	545.1	558.4	551.13	565.2	545.3	551.0
	CS net of SQ	19.0	-5.9	7.5	0.17	14.2	-5.7	
2021-2029	Consumer surplus	524.3	521.7	517.5	517.77	551.7	521.6	522.6
	CS net of SQ	1.7	-0.9	-5.1	-4.80	29.1	-1.0	
Consumer surplus		**1220.0**	**1203.4**	**1212.7**	**1200.2**	**1244.5**	**1203.9**	**1208.1**
CS net of SQ		**11.9**	**-4.7**	**4.6**	**-7.8**	**36.4**	**-4.1**	

Table 97 - Present value of consumer surplus (CS) using 7% discount rate (Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Consumer surplus	17.2	38.7	36.5	36.38	38.9	38.8	33.6
	CS net of SQ	-16.3	5.2	2.9	2.81	5.3	5.2	
2017	Consumer surplus	104.5	94.3	96.5	91.40	85.4	94.7	97.2
	CS net of SQ	7.3	-2.9	-0.7	-5.81	-11.8	-2.5	
2018-2020	Consumer surplus	509.1	486.7	498.9	491.66	504.2	486.8	492.0
	CS net of SQ	17.1	-5.3	6.9	-0.34	12.2	-5.2	
2021-2029	Consumer surplus	386.0	383.9	380.7	381.62	406.5	383.8	384.6
	CS net of SQ	1.4	-0.7	-3.9	-2.94	22.0	-0.8	
Consumer surplus		**1016.8**	**1003.5**	**1012.6**	**1001.06**	**1035.0**	**1004.0**	**1007.3**
CS net of SQ		**9.4**	**-3.8**	**5.3**	**-6.28**	**27.7**	**-3.3**	

5.4.3.7 Present Value of Total Economic Benefits

Economic benefits include the benefits both to the consumers and to the fishing industry, and equal the sum of benefits to the consumers and producers. Annual values for the economic benefits are shown in Table 26. The cumulative present value of the total benefits are summarized in Table 98(3% discount rate) and Table 29 (7% discount rate), and the economic benefits net of Status Quo (SQ) levels are shown in Table 28 (3% discount rate).

The short-term (2016) economic benefits for all alternatives are expected to exceed the levels for SQ. Total economic benefits of all the alternatives, except for the preferred alternative (Alt.3A) and No Action, will exceed SQ benefits over the long-term as well. However, over the long-term total benefits for the preferred alternative will short of SQ benefits by $35.6 million ($25.7 million) using a discount rate of 3% (7%) for the period 2016-2029.

Table 98 - Present value of total economic benefits (using 3% discount rate, Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Total Benefits (TB)	366.1	545.1	529.2	526.90	547.7	547.1	507.5
	TB net of SQ	-141.4	37.6	21.7	19.38	40.2	39.6	
2017	Total Benefits (TB)	883.7	845.5	853.3	834.37	812.6	846.8	857.3
	TB net of SQ	26.4	-11.8	-4.0	-22.92	-44.6	-10.5	
2018-2020	Total Benefits (TB)	3230.9	3176.9	3210.4	3185.18	3226.6	3177.1	3190.6
	TB net of SQ	40.3	-13.8	19.8	-5.44	36.0	-13.5	
2021-2029	Total Benefits (TB)	5313.1	5303.5	5283.4	5281.19	5435.2	5302.8	5307.8
	TB net of SQ	5.3	-4.3	-24.4	-26.63	127.4	-5.1	
Total Benefits (TB)		**9793.8**	**9870.9**	**9876.4**	**9827.63**	**10022.2**	**9873.7**	**9863.2**
TB net of SQ		**-69.4**	**7.7**	**13.1**	**-35.60**	**159.0**	**10.5**	

Table 99 - Present value of total economic benefits (using 7% discount rate, Million $, in 2015 constant prices)

Period	Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
2016	Total Benefits (TB)	366.1	545.1	529.2	526.90	547.7	547.1	507.5
	TB net of SQ	-141.4	37.6	21.7	19.38	40.2	39.6	
2017	Total Benefits (TB)	850.7	813.9	821.4	803.17	782.3	815.2	825.2
	TB net of SQ	25.4	-11.4	-3.8	-22.06	-43.0	-10.1	
2018-2020	Total Benefits (TB)	2885.5	2836.8	2867.5	2843.22	2880.4	2837.0	2849.3
	TB net of SQ	36.3	-12.5	18.2	-6.07	31.1	-12.3	
2021-2029	Total Benefits (TB)	3858.7	3850.9	3835.8	3837.26	3948.6	3850.4	3854.2
	TB net of SQ	4.5	-3.3	-18.4	-16.95	94.4	-3.8	
Total Benefits (TB)		**7961.0**	**8046.7**	**8054.0**	**8010.55**	**8159.0**	**8049.6**	**8036.3**
TB net of SQ		**-75.3**	**10.4**	**17.7**	**-25.70**	**122.8**	**13.3**	

5.4.3.8 Impacts of highgrading on landings and economic benefits over the long-term

The economic analyses presented above are based on the biological projections assuming that the size distribution of landings will reflect the composition of the exploitable biomass in the access areas. However, it is uncertain if that is a realistic assumption given that economic incentives for highgrading increased recently as the price differentials between the large (U10s and U12s) and smaller sizes have widened since 2014 fishing year. For example, average annual price for U10s were about half a dollar higher than the price of 11 to 20 count scallops in 2012. The price premium for U10s as compared to the annual average price of 11 to 20 count scallops increased to about a dollar in 2013, to $2 dollars in 2014 and to about $4 in the first 4 months of the 2015 fishing year (Table 100 and Table 101).

For these reasons, biological projections for the preferred alternative and alternative 5 with NLS access were also run incorporating potential impacts of highgrading on the scallop biomass and yield. The changes in the size composition of scallops due to highgrading are shown in Table 102 for fishing year 2016. The impacts on landings and economic benefits are slightly positive in 2016 due to higher prices for larger scallops, over the long-term landings and revenues would be lower. Highgrading would especially affect the long-term economic benefits for Alternative 5 (NLS acc.) since the NLS access area with a high abundance of small scallops. If there was no highgrading, Alternative 5 would result in positive economic benefits over the long-term from 2016-2029 (by about $13.3 million) compared to the Status Quo run. However, high grading would result in negative economic benefits by $11.2 million net of status quo benefits (**Table 103**). Highgrading would also lower economic benefits under the preferred alternative over the long-term, but by a lesser amount compared to Alternative 5. Overall, the net economic benefits of the preferred alternative (Alt3A. CA ext.) would be about $25.7 million lower than status quo benefits, and with highgrading, it would be about $28.1 million lower using a 7% discount rate. Is the long-term benefits were discounted less using a 3% rate, than the long-term economic benefits would be even lower compared to status levels by $35.6 million with no highgrading and by $38.4 million with highgrading.

Table 100 – Average Ex-vessel prices by meat count (In terms of 2014 prices)

Fishyear	U10	11-20 count	21plus count
2011	10.7	10.4	10.8
2012	10.6	10.0	10.1
2013	12.5	11.5	11.6
2014	14.0	12.0	11.8
2015	15.3	11.5	10.7

Note: 2015 is preliminary for months February to June only.

Table 101 – Average price premium for U10 scallops compared to smaller size categories (In terms of 2014 prices)

Fishyear	11 to 20 count		21 plus count	
	Dollar difference	% difference from U10 price	Dollar difference	% difference from U10 price
2011	0.3	3%	-0.1	-1%
2012	0.6	6%	0.5	5%
2013	1.0	8%	0.9	8%
2014	2.0	14%	2.2	18%
2015	3.8	25%	4.6	40%

Note: 2015 is preliminary for months February to June only.

Table 102 – Composition of landings by size category according to the biological projections for 2016.

Size category	Preferred 3A. CA2 ext.	Alt.3A high grading	5.NLS Acc.	5A. NLS high grading
U10	2.6%	3.0%	3.3%	4.5%
10-20	59.0%	58.6%	61.1%	59.9%
20-30	35.2%	35.2%	32.9%	32.9%
30-40	3.2%	3.2%	2.7%	2.7%
Total	100.0%	100.0%	100.0%	100.0%

Table 103 – Present value (PV) of total economic benefits (using 7% discount rate and in 2015 constant prices)

Period	Values	2. Basic Run	Preferred Alt.3A	Alt.3A highgrade	5.NLS Acc.	5A.NLS highgrade	SQ
2016	Landings (million lb.)	48.5	46.9	46.9	48.5	48.5	44.8
	Revenue (million $)	555.5	538.7	539.1	557.1	558.3	519.3
	Revenue net of SQ	36.2	19.3	19.8	37.7	38.9	
	Total econ.benefits (mill. $)	545.1	526.9	527.0	547.1	546.9	507.5
	Total econ.benefits net of SQ (mil. $)	37.6	19.4	19.4	39.6	39.4	
2017	Landings (million lb.)	82.9	81.5	81.5	83.1	83.3	84.4
	Revenue (million $)	787.9	779.1	779.0	789.0	789.8	797.2
	Revenue net of SQ	-9.3	-18.1	-18.2	-8.3	-7.4	
	Total econ.benefits (mill. $)	813.9	803.2	803.1	815.2	816.2	825.2
	Total econ.benefits net of SQ (mil. $)	-11.4	-22.1	-22.1	-10.1	-9.0	
2018-2020	Landings (million lb.)	360.8	363.4	363.1	360.9	361.5	363.0
	Revenue (million $)	2605.7	2612.3	2611.3	2605.9	2606.7	2614.0
	Revenue net of SQ	-8.3	-1.8	-2.8	-8.1	-7.4	
	Total econ.benefits (mill. $)	2836.8	2843.2	2841.7	2837.0	2836.9	2849.3
	Total econ.benefits net of SQ (mil. $)	-12.5	-6.1	-7.6	-12.3	-12.4	
2021-2029	Landings (million lb.)	614.0	610.4	610.3	614.0	608.5	614.5
	Revenue (million $)	3786.1	3773.3	3772.5	3785.7	3763.5	3788.9
	Revenue net of SQ	-2.8	-15.6	-16.3	-3.2	-25.4	
	Total econ.benefits (mill. $)	3850.9	3837.3	3836.4	3850.4	3825.0	3854.2
	Total econ.benefits net of SQ (mil. $)	-3.3	-17.0	-17.9	-3.8	-29.3	
Total landings (million lb.)		**1106.3**	**1102.2**	**1101.9**	**1106.5**	**1101.8**	**1106.7**
Total revenue (mill. $)		**7735.3**	**7703.3**	**7702.0**	**7737.6**	**7718.3**	**7719.5**
Revenue net of SQ		**15.8**	**-16.2**	**-17.5**	**18.1**	**-1.2**	
Total economic benefits (mill. $)		**8046.7**	**8010.5**	**8008.1**	**8049.6**	**8025.0**	**8036.3**
Total econ. Benefits net of SQ (mill. $)		**10.4**	**-25.7**	**-28.1**	**13.3**	**-11.2**	

Table 104 – Present value (PV) of total economic benefits (using 3% discount rate and in 2015 constant prices)

Period	Values	2. Basic Run	Preferred Alt3A. CA ext.	Alt.3A highgrade	5.NLS Acc.	5. NLS high grading	SQ
2016	Landings (million lb.)	48.5	46.9	46.9	48.5	48.5	44.8
	Revenue (million $)	555.5	538.7	539.1	557.1	558.3	519.3
	Revenue net of SQ	36.2	19.3	19.8	37.7	38.9	
	Total econ.benefits (mill. $)	545.1	526.9	527.0	547.1	546.9	507.5
	Total econ.benefits net of SQ (mil. $)	37.6	19.4	19.4	39.6	39.4	
2017	Landings (million lb.)	82.9	81.5	81.5	83.1	83.3	84.4
	Revenue (million $)	818.5	809.3	809.3	819.6	820.5	828.2
	Revenue net of SQ	-9.6	-18.8	-18.9	-8.6	-7.7	
	Total econ.benefits (mill. $)	845.5	834.4	834.3	846.8	847.9	857.3
	Total econ.benefits net of SQ (mil. $)	-11.8	-22.9	-23.0	-10.5	-9.4	
2018-2020	Landings (million lb.)	360.8	363.4	363.1	360.9	361.5	363.0
	Revenue (million $)	2918.1	2926.2	2925.1	2918.3	2919.3	2927.3
	Revenue net of SQ	-9.2	-1.0	-2.2	-9.0	-7.9	
	Total econ.benefits (mill. $)	3176.9	3185.2	3183.5	3177.1	3177.2	3190.6
	Total econ.benefits net of SQ (mil. $)	-13.8	-5.4	-7.1	-13.5	-13.4	
2021-2029	Landings (million lb.)	614.0	610.4	610.3	614.0	608.5	614.5
	Revenue (million $)	5223.0	5202.2	5201.2	5222.4	5189.9	5226.7
	Revenue net of SQ	-3.7	-24.5	-25.5	-4.3	-36.8	
	Total econ.benefits (mill. $)	5303.5	5281.2	5280.0	5302.8	5265.8	5307.8
	Total econ.benefits net of SQ (mil. $)	-4.3	-26.6	-27.8	-5.1	-42.1	
Total landings (million lb.)		**1106.3**	**1102.2**	**1101.9**	**1106.5**	**1101.8**	**1106.7**
Total revenue (mill. $)		**9515.2**	**9476.4**	**9474.7**	**9517.4**	**9488.0**	**9501.5**
Revenue net of SQ		**13.7**	**-25.1**	**-26.8**	**16.0**	**-13.5**	
Total economic benefits (mill. $)		**9870.9**	**9827.6**	**9824.8**	**9873.7**	**9837.8**	**9863.2**
Total econ. Benefits net of SQ (mill. $)		**7.7**	**-35.6**	**-38.4**	**10.5**	**-25.4**	

5.4.3.9 Impacts of density dependence on landings and economic benefits over the long-term

According to the biological projections, the scallop landings are estimated to reach record levels, exceeding 80 million lb. 2017 and 100 million lb. in 2018-2030 because biomass is expected to increase dramatically in 2017 (Table 83).

However, the PDT is concerned that the model may be seriously underestimating natural mortality of juvenile scallops in high density areas. If higher than normal natural mortality occurs, these estimates will be overestimated, especially for 2017. The model currently assumes constant natural mortality (0.16 on GB and 0.2 in the Mid-Atlantic on all sizes except the plus group). However, the PDT believes that natural mortality of juveniles is higher in areas of high density.

In order to estimate the impact of an overestimation in biomass and landings, the PDT run two additional projections for ALT 2 (Basic Run) taking into account potentially negative impacts of

density on mortality. The projections shown for 2A below were estimated by increasing the natural mortality for all years (assuming long-term impacts) and all sizes in the high density areas (Table 105 and Table 106).

The results show that, landings would be about 67 million in 2017 instead of the 88 million lb., estimated for ALT2 (Basic Run). As a result, the estimated present value of revenues in 2017 would be about $108.7 (or 13%) and total economic benefits would be $127 million (or 15%) less compared to the basic Run. Similarly, if this scenario is more realistic, the projections for all alternatives from ALT2 to ALT 5would have overestimated present value of economic benefits by 24% over the long-term from 2016 to 2019 (Table 106).

The second scenario analysis, 2B, was run by using a different assumes that density dependence would have negative impacts on the mortality in the short-term. Specifically, juveniles in this run is assumed to suffer an initial natural mortality of about 0.7 (compared to 0.2), but after that, their mortality is assumed to stay at normal levels. This is similar to what was observed in the first large Elephant Trunk year class. Because there is only one time of increased mortality in the short-term, medium to long term landings and economic benefits are higher in run Alt2.2B compared to the projections ALT.2A which assumed long-term impacts on mortality. Therefore, if the density dependence affects the initial conditions only, revenues and economic benefits would still be overestimated respectively by $68.8 million (or by 8%) and by 78.5 million (or by 9%) in 2017. In the long-term from 2016 to 2029, this scenario would result in 7% lower economic benefits not only compared to base run for ALT2, but compared to all the other alternatives ALT3 to ALT5.

Table 105 – Present value of total economic benefits (using 3% discount rate)

Period	Values	Alt2. Basic Run	2A. Density Dependence LT	2B. Density dependence ST
2016	Landings (million lb.)	48.5	47.9	48.5
	Revenue (million $)	555.5	550.6	558.7
	Revenue net of Basic run (mill. $)		-4.9	3.2
	Total economic benefits (mill. $)	545.1	540.1	549.1
	Total economic ben net of Basic run mill. $)		-5.0	4.0
2017	Landings (million lb.)	82.9	67.0	73.0
	Revenue (million $)	818.5	709.9	749.7
	Revenue net of Basic run (mill. $)		-108.7	-68.8
	Total economic benefits (mill. $)	845.5	718.4	766.9
	Total economic ben net of Basic run mill. $)		-127.0	-78.5
2018-2020	Landings (million lb.)	360.8	230.5	299.0
	Revenue (million $)	2918.1	2248.8	2632.3
	Revenue net of Basic run (mill. $)		-669.3	-285.8
	Total economic benefits (mill. $)	3176.9	2304.4	2785.0
	Total economic ben net of Basic run mill. $)		-872.4	-391.9
2021-2029	Landings (million lb.)	614.0	437.0	588.4
	Revenue (million $)	5223.0	4025.3	5055.3
	Revenue net of Basic run (mill. $)		-1197.7	-167.8
	Total economic benefits (mill. $)	5303.5	3951.3	5107.2
	Total economic ben net of Basic run mill. $)		-1352.2	-196.3
Grand totals	Landings (million lb.)	**1106.3**	**782.3**	**1009.0**
	Revenue (million $)	**9515.2**	**7534.6**	**8996.0**
	Revenue net of Basic run (mill. $)		**-1980.6**	**-519.2**
	Total economic benefits (mill. $)	**9870.9**	**7514.3**	**9208.3**
	Total economic ben net of Basic run mill. $)		**-2356.7**	**-662.7**
	% change in total economic benefits (compared to basic run)		**-24%**	**-7%**

Table 106 – The impacts of density dependency on landings and economic benefits (% Change from Alt.2 – Basic Run)

Period	Values	2A. Density Dependence LT	2B. Density dependence ST
2016	Landings (million lb.)	-1%	0%
	Revenue (million $)	-1%	1%
	Total economic benefits (mill. $)	-1%	1%
2017	Landings (million lb.)	-19%	-12%
	Revenue (million $)	-13%	-8%
	Total economic benefits (mill. $)	-15%	-9%
2018-2020	Landings (million lb.)	-36%	-17%
	Revenue (million $)	-23%	-10%
	Total economic benefits (mill. $)	-27%	-12%
2021-2029	Landings (million lb.)	-29%	-4%
	Revenue (million $)	-23%	-3%
	Total economic benefits (mill. $)	-26%	-4%
Landings (million lb.)		**-29%**	**-9%**
Revenue (million $)		**-20%**	**-6%**
Total economic benefits (mill. $)		**-24%**	**-7%**

Table 107 – The impacts of density dependency on landings

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	8.NLS high grade	SQ
					No impacts due to density dependence				
2016	2016	30.6	48.5	46.9	47	48.6	48.5	48.5	44.8
2017	2017	87.9	82.9	84.1	82	78.3	83.1	83.3	84.4
2018-2020	2018	118.1	114.1	118.7	113	115.6	114.2	114.0	115.2
	2019	135.7	131.9	131.3	133	131.8	131.9	131.9	132.9
	2020	116.4	114.8	115.9	118	121.2	114.9	115.6	114.9
2018-2020	average	123.4	120.3	122.0	121.1	122.9	120.3	120.5	121.0
2021-2029	average	68.4	68.2	67.9	67.8	70.2	68.2	67.6	68.3
2016-2029	average	78.9	79.0	79.2	78.7	80.5	79.0	78.7	79.1
					Density dependence – Long-term impacts (Scenario 2B)				
2016	2016	30.6	48.6	47.0	47.0	48.6	48.6	48.6	44.9
2017	2017	88.0	83.0	84.2	81.6	78.4	83.2	83.4	84.5
2018-2020	2018	80.4	77.7	80.9	76.7	78.7	77.7	77.6	78.5
	2019	91.4	88.9	88.5	89.4	88.8	88.9	88.9	89.5
	2020	82.4	81.2	82.0	83.5	85.8	81.3	81.8	81.3
2018-2020	average	84.7	82.6	83.8	83.2	84.4	82.6	82.8	83.1
2021-2029	average	65.5	65.4	65.1	65.0	67.3	65.4	64.8	65.4
2016-2029	average	72.5	72.8	72.9	72.5	74.1	72.8	72.5	72.8
					Density dependence – Short-term impacts (Scenario 2A)				
2016	2016	30.2	47.9	46.3	46.3	47.9	47.9	47.9	44.2
2017	2017	71.0	67.0	67.9	65.8	63.2	67.1	67.3	68.1
2018-2020	2018	83.2	80.4	83.7	79.4	81.4	80.4	80.3	81.2
	2019	84.2	81.9	81.5	82.4	81.8	81.9	81.9	82.5
	2020	69.2	68.2	68.9	70.2	72.0	68.2	68.7	68.3
2018-2020	average	78.9	76.8	78.0	77.3	78.4	76.9	77.0	77.3
2021-2029	average	48.6	48.6	48.4	48.2	49.9	48.5	48.1	48.6
2016-2029	**average**	**55.4**	**55.9**	**56.0**	55.6	**56.8**	**55.9**	**55.6**	**55.8**

Table 108 – The impacts of density dependency on total economic benefits assuming density dependence has long-term impacts on mortality (Applying Scenario 2A's reductions, 7% discount rate)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	4.ETA ext.	5.NLS Acc.	8.NLS high-grade	SQ
2016	2016	362.8	540.1	524.4	542.7	542.1	542.0	502.9
2017	2017	722.8	691.6	698.0	664.7	692.7	693.6	701.2
2018-2020	2018	779.6	761.8	782.4	769.7	761.8	760.7	767.0
	2019	730.2	717.7	716.9	720.4	717.6	716.6	721.3
	2020	587.6	581.9	585.5	601.9	582.2	584.0	582.4
2021-2029	2021	482.7	480.1	478.5	497.7	480.0	477.7	480.7
	2022	400.8	399.3	397.2	411.8	399.2	397.4	399.8
	2023	347.9	347.1	344.6	355.2	347.0	345.3	347.5
	2024	317.5	317.1	315.0	324.0	317.0	316.8	317.4
	2025	294.9	294.7	293.4	301.4	294.7	294.6	295.0
	2026	276.3	276.2	275.4	280.2	276.2	273.2	276.4
	2027	259.3	259.4	258.9	262.8	259.3	255.1	259.5
	2028	242.5	242.6	242.3	251.6	242.5	243.0	242.6
	2029	236.5	236.6	236.5	239.7	236.6	230.3	236.6
Grand Total		6041.5	6146.1	6149.1	6223.8	6148.9	6130.2	6130.3
Net of SQ		-88.8	15.9	18.9	93.5	18.6	0.0	0.0

Table 109 – The impacts of density dependency on total economic benefits assuming density dependence has short-term impacts on mortality (Applying Scenario 2B's reductions, 7 % discount rate)

Period	Fishing year	1. No Action	2. Basic Run	3. CA2 ext.	4.ETA ext.	5.NLS Acc.	8.NLS high-grade	SQ
2016	2016	368.8	549.1	533.1	551.8	551.1	551.0	511.2
2017	2017	856.9	819.8	827.4	788.0	821.1	822.2	831.3
2018-2020	2018	874.2	854.2	877.3	863.0	854.2	853.0	860.1
	2019	887.3	872.1	871.2	875.4	871.9	870.7	876.5
	2020	767.8	760.3	765.0	786.4	760.6	763.0	760.9
2021-2029	2021	644.1	640.5	638.5	664.0	640.5	637.3	641.3
	2022	534.0	532.0	529.2	548.7	531.9	529.4	532.7
	2023	459.0	458.0	454.7	468.6	457.9	455.6	458.5
	2024	409.2	408.7	406.1	417.6	408.6	408.4	409.1
	2025	376.0	375.8	374.1	384.3	375.7	375.7	376.1
	2026	350.8	350.7	349.7	355.7	350.6	346.9	350.9
	2027	328.4	328.4	327.8	332.7	328.4	323.1	328.5
	2028	308.3	308.4	308.1	320.0	308.4	309.0	308.5
	2029	293.6	293.7	293.5	297.6	293.7	285.9	293.7
Grand Total		7458.3	7551.8	7555.8	7653.8	7554.7	7531.1	7539.4
Net of SQ		-81.1	12.4	16.4	114.4	15.3	-8.3	0.0

5.4.3.10 Allocation method for FT LA access area allocations

5.4.3.10.1 No Action – No Lottery – equal access per vessel (preferred alternative)

Under this alternative there would not be a lottery. Each LA vessel in each permit category (FT, PT, Occasional), would receive the same level of access. For example, under the preferred alternative (Alternative 3a) each FT LA vessel would receive 51,000 pounds in the MAAA. No lottery would be necessary because each vessel is allocated the same amount per area. The preferred alternative only includes one access area for LA vessels; therefore no lottery is necessary. Consequently, No Action would have neutral economic impacts on vessels under the preferred alternative. However, for other alternatives that provide access to CA2 and NLS areas, lottery would be necessary since there isn't sufficient projected landings for each vessel to receive one full trip at 17,000 lb. in those areas. Without a lottery, no trips could be allocated to CA2 or NLS access areas, so no action would have negative economic impacts on the fishery under all the other alternatives other than the preferred alternative 3A.

5.4.3.10.1 Lottery Option 1 – Lottery allocation for specification alternatives with MA and CA2 access only

The equivalent of one FT LA trip (17,000 pounds) would be allocated by lottery based on the table below (**Table 14**). The projected catches per area have been reduced for convenience and to acknowledge some level of mortality from other sources (LA PT and LAGC IFQ fishing in access areas). This alternative would have positive economic impacts for vessels under alternatives 2, 3 or 4 which provides access to CA2. Again, without a lottery option, no trips could be allocated to that area. Any vessel that doesn't receive a trip to CA2 by lottery, will get the third trip to MAAA so that each FT vessel will have 3 access area trip allocations.

Table 110 – Lottery Option 1 allocations for LA FT vessels (if NL remains closed)

2016	Projected Landings (mt)	Total # of Possible Trips	Trips available for lottery	Lottery*
MAAA	6500	843	217	183
CA2	1000	130	130	130
Total	7500	973	347	313

5.4.3.10.2 Lottery Option 2 – Lottery allocation for specification alternatives with NL access included

The equivalent of one FT LA trip (17,000 pounds) would be allocated by lottery based on the table below (**Table 15**). This alternative would have positive economic impacts for vessels under alternative 5 which provides access both to CA2 and the northern part of NL. Again, without a lottery option, no trips could have been allocated to these areas. Any vessel that doesn't receive a trip to CA2 or to NLS by lottery, will get the third trip to MAAA so that each FT vessel will have 3 access area trip allocations.

Table 111 – Lottery Option 2 allocations for LA FT vessels (if NL opens)

2016	Projected Landings (mt)	Total # of Possible Trips	Trips available for lottery	Lottery*
MAAA	6100	791	165	157
CA2	1000	130	130	104
NLS	400	52	52	52
Total	7500	973	347	313

5.4.3.11 Allocation of LAGC IFQ trips in access areas

The LAGC IFQ fishery is allocated a fleetwide total number of access area trips. Individual vessels are not required to take trips in specific areas like access area trips allocated to the limited access fishery. Instead, maximum number of trips is identified for each area and once that limit is reached, the area closes to all LAGC IFQ vessels for the remainder of the fishing year. In addition to No Action, the PDT has developed three different allocations options to determine the overall number of trips, and three area alternatives to determine the number of trips per area.

Table 112 – Summary of trips and poundage for all LAGC AA allocation and area options
Allocation Option 2 and Area Option 3 are the preferred alternatives

				MAAA		CA2		NL	
	MT	Pounds	# Trips	trips	pounds	trips	pounds	trips	pounds
Allocation Option 1	163.8	361,200	602						
Allocation Option 2	694.7	1,531,549	2,553						
Area Option 1	100% in MA AA			2,553	1,531,549	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			2,246	1,347,763	0	0	306	183,786
Area Option 3	81% from MAAA, 19% from NL			2,068	1,240,555	0	0	485	290,994
Allocation Option 3	414.5	913,893	1,523						
Area Option 1	100% in MA AA			1,523	913,893	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			1,340	804,226	0	0	183	109,667
Area Option 3	81% from MAAA, 19% from NL			1,234	740,254	0	0	289	173,640
Allocation Option 4	562.5	1,240,114	2,065						
Area Option 1	100% in MA AA			2,065	1,240,114	0	0	0	0
Area Option 2	88% from MAAA, 12% from NL			1,817	1,091,300	0	0	248	148,814
Area Option 3	81% from MAAA, 19% from NL			1,673	1,004,492	0	0	392	235,622

5.4.3.11.1 LAGC AA Allocation Option 1 – No Action (602 trips)

Under No Action (Option 1) LAGC IFQ vessels would be allocated 602 trips in MAAA access areas starting on April 1. This is equivalent to default number of trips from FW26 and to a small fraction of what they would be allocated to LAGC IFQ fishery under other options for the access areas. Under this option most LAGC catch would come from open areas. However, the cost of fishing could be higher in the open compared to fishing in access areas which are expected to

have a higher stock abundance. Usually larger scallops have a price premium compared to smaller ones and if larger scallops are more abundant in access areas, not being able to fish in those areas could affect the revenues negatively as well. Thus, this option could have negative economic impacts on the LAGC IFQ vessels compared to other options.

5.4.3.11.2 LAGC AA Allocation Option 2 (Preferred)– Same AA proportion of catch (2,553 trips)

Option 2 the number of trips would be based on the total proportion of catch from AA compared to open areas (34% for 2,553 trips). Thus, it would allocate about 1.5 million pounds of the total LAGC allocation of 4.4 million pounds from access areas, while about 3 million pounds would still be left of the LAGC quota to be harvested in open areas. This option would have the highest economic benefits for the LAGC fishery since it would provide more access area trips for IFQ vessels compared to no action and options 2 and 4. It would allow the LAGC IFQ vessels to fish in more productive areas to reduce their fishing costs by catching the possession limit in a shorter time-period as well as to optimize the size composition of their landings by selectively fishing in areas abundant with larger scallops. Since larger scallops in general command a higher price, this option could also have positive impacts on revenues.

5.4.3.11.3 LAGC AA Allocation Option 3 – Same overall allocation of 5.5% (1,523 trips)

This alternative would allocate 5.5% of the access area TAC per area to the LAGC fishery in the form of fleetwide trips. An allocation of 5.5% of that amount is equivalent to about 913,893 pounds, or 1,523 trips with a 600 pound possession limit. This option would allow the LAGC IFQ effort to be distributed over more areas providing opportunity to vessels to fish in more productive areas to reduce their fishing costs by catching the possession limit in a shorter time-period as well as to optimize the size composition of their landings by selectively fishing in areas abundant with larger scallops. Since larger scallops in general command a higher price, this option could also have positive impacts on revenues. However, the number of trips and scallops pounds allocated to access areas for the LAGC fishery is considerably lower compared to Option 2. Therefore Option 3 is expected to have positive economic impacts compared to No Action, but lower economic benefits compared to Option 2.

5.4.3.11.4 LACG AA Allocation Option 4 – same as FY2015 (2,065 trips)

Option 4 would provide the same number of access area trips as FY2015, about 2,065 trips or 1.2 million pounds. In common with the other options, Option 4 would also allow the LAGC IFQ vessels to fish in more productive areas, would help to lower the fishing costs by catching the possession limit in a shorter time-period. It would also help optimize scallop revenues by selectively fishing in areas abundant with larger scallops that, in general, command a higher price. However, number of access area allocations for Option 4 would be less than the number of trips that would be allocated under Option 2 but more than the number of trips for No Action and Option 3. Consequently, potential impacts of this option on the total economic benefits would fall between Option 2 and 3, considerably higher economic benefits compared to No Action, but less benefits than Option 2 and more than Option 3, proportional to the number of access area trip allocations.

5.4.3.12 LAGC AA Allocations (by area)

5.4.3.12.1 LAGC Access Area Option 1 – NL closed – all trips in MAAA

This option could increase the fishing costs and reduce profits for LAGC vessels which are smaller in size and homeported in Massachusetts by allocating all access area trips to the Mid-Atlantic access areas instead of allocating a fraction of trips to the NLS North which is in close proximity to these boats.

5.4.3.12.2 LAGC Access Area Option 2 – NL Open – Prorate CA2 trips to MAAA and NL evenly

Option 2 provides more flexibility by allocating 12% of the LAGC access area trips to open part of NLS area. This could benefit the LAGC vessels especially those that are homeported in Massachusetts by reducing the trip time and costs of fishing.

5.4.3.12.3 LAGC Access Area Option 3 (Preferred) – NL Open – Prorate CA2 trips all to NL

Preferred area option (option 3) would allocate about 19% of these trips (or 300,000 lb.) to the NLS North which is open to LAGC vessels only. The IFQ vessels that are homeported in Massachusetts, as well as in other states of the New England could benefit from this option due to their proximity to the NLS access area compared to the Mid-Atlantic access areas.

In 2014, a total of 49 active IFQ vessels were homeported in the New England states, and 38 of these were from Massachusetts, where the remaining 74 active IFQ vessels were located in the Mid-Atlantic States (**Table 113**). In general, the IFQ boats from the New England region were smaller than the ones from Mid-Atlantic in terms of horsepower, gross tonnage and length (**Table 115**). They are also much smaller than the limited access vessels homeported in the New England or in Mid-Atlantic (**Table 116**).

Although the number of active IFQ vessels increased during this period, the geographic distribution of the total number of vessels didn't change much. About 40% of the active IFQ vessels were homeported in the New England states and 60% were homeported in the Mid-Atlantic States during 2012-2014 (**Table 114**). Despite the constancy of this regional composition, scallop revenues per vessel for the IFQ boats homeported in Massachusetts declined in 2014 compared to the previous years, and the percentage share of scallop revenue from the vessels located in New England declined to 37% in 2014 from 44% in 2012 and 2013 (**Table 117** and **Table 118**). The reasons for this decline in revenues could be due to a variety of other factors including the changes in the scallop resource conditions in open areas as well as due to leasing-out of quota by the IFQ vessels from New England to vessels homeported in Mid-Atlantic. The revenue figures do not include income from leasing out and for some vessels that leased out their quota to vessels in Mid-Atlantic, total revenues could be higher than shown in **Table 117**.

The NLS access area was open to fishing in 2014 as well as in 2013 with limited number of trip allocations, but few trips were actually taken by IFQ vessels in this area especially in 2014 with only 1% of trip allocations are used in NLS (Table 119 and Table 120). Therefore, there is no guarantee that all the trips that are allocated for NLS access area will in fact be taken in 2016, although having the flexibility to access this area could have positive economic impacts if the resource conditions turn out to be relatively better compared to inshore open areas. The

preliminary data for 2015 fishing year for March 1st to Dec.10th shows that only 47% of landings took place in open areas, while in 2012-2014, the proportion of open area landings were 89% or higher. If this is an indication of relative resource conditions in the open areas being less favorable comparable to access areas, then it might be possible that under option 3 more access trips will be taken in NLS in 2016 fishing year compared to the previous three years. LAGC vessels would still have the ability to lease quota throughout the region if fishing conditions are not as favorable in that area. Overall, allowing some access to high density areas in GB as well as in Mid-Atlantic could help provide high quality fresh product in smaller coastal communities throughout the region also benefiting scallop consumers throughout the Northeast.

In conclusion, preferred option 3 is expected to have positive economic impacts especially on IFQ boats that are homeported in the New England states. Allowing these vessels to take some of their trips in the NLS access area will help to increase incomes for the vessel owners and the crew by lowering trip costs compared to fishing in access areas of Mid-Atlantic. In addition, if the scallops landed from the NLS access area are larger in size, the prices and revenues will be higher as well. The IFQ vessels that are homeported in Mid-Atlantic could also benefit from this measure as fewer boats from the north may choose to travel to Mid Atlantic access areas (MAAA) when they have access to NLS. This could reduce competition and fishing effort in MAAA and improve catch per unit effort helping the boats located in Mid-Atlantic to land their possession limit in fewer hours and at reduced costs. As a result of lower fishing costs and higher profits both due fishing in NLS north and lower effort in Mid-Atlantic access areas, this measure is expected to have low positive impacts on the total economic benefits from the scallop fishery as a whole. Since this option is not expected to have any significant effects on the scallop biomass over the long-term given that the highest concentrations of small scallops observed on Georges Bank in 2015 would still be closed to all scallop fishing, total economic benefits for the scallop fishery will be positive compared to Option 2 as well as compared to Option 1.

The changes in the location of effort and geographic distribution of allocations could also have some impacts on the IFQ leasing transactions and costs. When no access is provided to NLS as in Option 1 and 2, some vessels in the New England area could resort to leasing their quota to vessels in Mid-Atlantic rather than to incur fuel and other trip costs from traveling to MAAA. Under Option 3, however, New England vessels could choose to use their own quota in order to fish locally. This could reduce total supply of quota available for leasing. On the other hand, the availability of NLS access for fishing would reduce the demand for quota by New England boats. Therefore, the impact of this shift alone on the change in overall lease prices could be neutral. If the catch in NLS access area includes larger scallops relative to the Mid-Atlantic access areas, it is possible that the lease prices increase somewhat, however, there is no guarantee that this will be indeed the case given that scallop resource in NLS included smaller scallops relative to the other areas. In conclusion, the distribution of access area allocations could have some impacts on prices, however, those impacts would be uncertain given that not only the size of scallops but several other factors, including the distance to each area from the homeports of IFQ holders, the fuel and trip costs, total amount of IFQ available, distribution of IFQ holdings among the active vessels, relative price of scallops by market category have an influence on lease prices.

Table 113 - Number of active LAGC-IFQ permits by year and homeport

Region	Home state	2012	2013	2014
Mid Atlantic	NJ	35	36	43
	NY	11	11	13
	Oth.Mid.Atl.	19	17	18
Mid.Atl. Total		**65**	**64**	**74**
New England	MA	31	31	38
	ME+NH	3	3	4
	RI+CT	7	9	7
New Eng. Total		**41**	**43**	**49**
Grand Total		**106**	**107**	**123**

Number of permits may include some double counting if a permit upgraded during the year.

Table 114 - Number of active LAGC-IFQ permits by homeport as a % of total number of vessels

Region	Home state	2012	2013	2014
Mid.Atl.	NJ	33%	34%	35%
	NY	10%	10%	11%
	Oth.Mid.Atl.	18%	16%	15%
Mid.Atl. Total		**61%**	**60%**	**60%**
New Eng.	MA	29%	29%	31%
	ME+NH	3%	3%	3%
	RI+CT	7%	8%	6%
New Eng. Total		**39%**	**40%**	**40%**
Grand Total		**100%**	**100%**	**100%**

Table 115 - Characteristics of active vessels with IFQ permits (2014 fishing year)

Region	Home state	Number of vessels	Horsepower	GRT	Length	Crew size
Mid.Atl.	NJ	43	496	66	59	4.1
	NY	13	386	55	53	3.6
	Oth.Mid.Atl.	18	613	96	71	4.2
Mid.Atl. Total		**74**	**505**	**71**	**61**	**4.1**
New Eng.	MA	38	392	47	51	4.3
	ME+NH	4	414	32	44	2.8
	RI+CT	7	339	24	44	3.1
New Eng. Total		**49**	**386**	**43**	**50**	**4.0**
All ports		**123**	**458**	**60**	**56**	**4.0**

Table 116 - Characteristics of vessels with limited access permits (2014)

Region	Home state	Number of vessels	Horsepower	GRT	Length	Crew size
Mid.Atl.	NC	40	584	125	78	6
	NJ	95	646	124	74	7
	Oth.Mid.Atl.	6	597	137	72	6
	VA	46	660	143	79	7
Mid.Atl. Total		**187**	**634**	**129**	**76**	**7**
New Eng.	MA	150	889	157	83	7
	ME+NH	3	500	83	66	6
	RI+CT	11	994	164	82	7
New Eng. Total		**164**	**889**	**156**	**82**	**7**
All ports		**351**	**753**	**142**	**79**	**7**

Table 117 - Scallop revenue per IFQ vessel by year by homeport

Region	Home state	2012	2013	2014
Mid Atlantic	NJ	293,611	273,857	305,048
	NY	209,284	208,921	233,102
	Oth.Mid.Atl.	152,556	168,096	151,373
Mid.Atl. Total		238,109	234,603	255,028
New England	MA	339,943	321,722	232,578
	ME+NH	121,359	198,428	215,758
	RI+CT	174,179	123,760	169,174
New Eng. Total		295,648	271,686	222,147
Grand Total		260,364	249,506	241,929

Table 118 - Distribution of scallop revenue by IFQ vessels by year and home poet

Region	Home state	2012	2013	2014
Mid.Atl.	NJ	37%	37%	44%
	NY	8%	9%	10%
	Oth.Mid.Atl.	11%	11%	9%
Mid.Atl. Total		**56%**	**56%**	**63%**
New Eng.	MA	38%	37%	30%
	ME+NH	1%	2%	3%
	RI+CT	4%	4%	4%
New Eng. Total		**44%**	**44%**	**37%**
Grand Total		**100%**	**100%**	**100%**

Table 119 - LAGC IFQ landings (lb.) by area

Fishyear	2012	2013	2014	2015*
Open areas	2,692,929	2,174,239	1,811,897	993,419
% of total landings	98%	98%	89%	47%
NLS	19,205	37,573	1,906	0
Delmarva	1,353		225,911	0
HC	42,079	634		0
Mid-Atlantic total	62,637	38,207	225,911	1,116,035
All areas	2,755,566	2,212,446	2,039,714	2,109,454
sub-ACL	3,095,450	2,227,142	2,202,859	2,700,663
% of ACL	89%	99%	93%	78%

*Up to December 10, 2015

Table 120 - LAGC IFQ trips (lb.) by access area

Access area	Fishyear	2012	2013	2014	2015*
NLS	Number of trips allocated	296	206	241	
	Actual number of trips taken	38	65	3	
	% of allocated	13%	32%	1%	
Delmarva	Number of trips allocated	296	0	516	
	Actual number of trips taken	5	0	411	
	% of allocated		0	80%	
Hudson Canyon	Number of trips allocated	887	317		
	Actual number of trips taken	127	9		
	% of allocated	14%	3%		
Mid-Atlantic total	Number of trips allocated				2065
	Actual number of trips taken				2019
	% of allocated				98%

5.4.3.13 Additional measures to reduce impacts on small scallops

5.4.3.13.1 Alternative 1 - No Action (Default – RSA comp restricted to open areas)

Restricting RSA compensation fishing to open areas would protect the small scallops that are mostly present in the access areas, especially in the NL access area. However, MAAA and CA2 access already prohibits fishing in those portions where small scallops are most concentrated, so not allowing RSA compensation trips to other portions in those areas could be unnecessarily restrictive. Therefore, No Action could have some slight positive impacts on the resource over the long-term. However, it could also have some low negative economic impacts on vessels in the short-term by prohibiting fishing in relatively more productive access areas (of Mid Atlantic and CA2) at lower costs.

5.4.3.13.2 Alternative 2 - Status Quo – RSA in any area open to the scallop fishery

This option is the least restrictive compared to both Alternative 1 and Alternative 3 and could have some slight positive economic impacts on vessels allowing them to fish in the more productive access areas at lower costs. However, allowing RSA compensation fishing in any access areas opened in this action would not protect the small scallops which are abundant in the access areas, especially in the NL access area. This could result in negative long-term impacts on the scallop biomass and economic benefits from this fishery.

5.4.3.13.3 Alternative 3 – (Preferred) Prohibit RSA compensation fishing in NL access area, if open

This alternative provides more flexibility to vessels compared to No Action (Alternative 1) by permitting RSA compensation fishing from any area open to the scallop fishery, with the exception of NL, if opened by this action. This provision has been used in the past to reduce impacts on small scallops and overall mortality in that area because it is traditionally a very attractive area to fish RSA poundage due to proximity to major ports (i.e. New Bedford). As a result, this alternative could have beneficial impacts on the scallop resource and would therefore have long-term positive impacts on landings, revenues and total economic benefits compared to Alternative 2, which allows fishing everywhere. Because it is less restrictive than the No action alternative, it could also have slightly higher economic benefits for vessels in the short-term. Over the long-term, the impacts of this alternative on economic benefits would either be neutral or marginally negative compared to the No Action alternative.

5.4.3.14 Uncertainties and risks

The economic impacts presented in the above sections are analyzed using the estimate of prices, costs, revenues and total net benefits based on the economic model provided in Appendix II. The estimated fishing costs are used in calculating producer surplus for the proposed alternatives, which shows total revenue net of variable costs. The costs and the benefits of the proposed alternatives were analyzed based on the biological projections of landings, DAS and LPUE and the available information about the vessel costs and characteristics, crew shares and prices. The numerical results of these analyses should be interpreted with caution due to uncertainties about the likely changes in:

- factors affecting scallop resource abundance
- changes in the size composition of landings
- fishing behavior
- fixed costs
- variable costs
- import prices
- demand for scallop exports
- bycatch and revenues from other fisheries
- the crew share system
- change in the number of active vessels
- structural changes in ownership
- changes in the composition of fleet in terms of tonnage, HP and crew size of the active vessels
- disposable income and preferences of consumers for scallops

The estimated values of the economic cost/benefit analysis should be used solely in comparing preferred action with the other alternatives since the uncertainties related to landings and prices are expected to affect all alternatives in the same direction.

The landings streams, size composition of landings, DAS and LPUE were obtained from the biological model, which is based on fishing mortality by area and the inputs are not fishery-based in terms of DAS, etc. The biological simulations do not model individual vessels or trips; it models the fleet as a whole. The output of the biological model and the landings streams were used to estimate the costs and benefits of the preferred action and alternatives. The results for economic impacts would change if the actual landings, size composition of landings and LPUE are different than the forecasted values from the biological model.

The prices are estimated using the ex-vessel price model described in Appendix II. This model takes into account the impacts of changes in meat count, domestic landings, exports, price of imports, income of consumers, and composition of landings by market category (i.e., size of scallops).
The important changes in external factors, i.e., in exports, imports, value of dollar, export and import prices had some unpredictable impacts on scallop prices in recent years, first resulting an increase to over $8 per pound (in terms of 2008 prices) in 2005, then a consequent decline to about $7 per pound (in terms of 2008 prices) in 2006 even though there was not a significant increase in scallop landings in 2006 (about 56 million lb.) compared to 2005 (about 54 million lb.). Since 2010 fishing year, however, the decline in the value of dollar, strong demand for scallops especially from the European countries and a diminished supply from Japan and other competing, scallop-producing nations resulted in much higher prices than anticipated in the previous frameworks. Thus, any change in the external factors that affect price, such as in import prices or in the differences between the actual and projected landings will result in differences in the actual and estimated prices.

In addition, the prices were estimated by holding the values of the all the variables that impact prices, such as import prices and disposable income, at the recent levels. For example, disposable income per capita and import prices are assumed to stay constant at the 2015 levels for the economic analyses of this Framework action. This is because it is not possible to predict accurately the changes in the future values of the explanatory variables and also because our goal is determine the response in prices to the change in landings and the composition in terms of market category given other things held constant. Therefore, future prices could be higher (or lower) than predicted depending on the values of the explanatory variables.

For these reasons, the empirical results of the economic analyses should be used to compare alternatives with each other and with No Action or status quo --rather than to estimate the absolute values--since a change in the variables listed above will change the numerical results in the same direction. For example, an increase in import prices would lead to a rise in ex-vessel prices and revenues for all alternatives above the levels estimated in the sections above. An increase in the price of oil, on the other hand, would increase the variable costs and reduce the cost savings under all options. While these changes would affect the absolute values of net economic benefits, the ranking of alternatives in terms of their impacts on revenues, costs, and net benefits are not expected to change.

5.5 NON-TARGET SPECIES

5.5.1 Overfishing limit and annual biological catch

The overfishing limit and annual biological catch are the absolute limits the fishery is not allowed to exceed. The No Action ABC is lower than the proposed ABC in this action because biomass has increased based on updated survey results. However, the No Action ABC and the proposed ABC in FW27 are similar and not great enough to have direct impacts on the fishery since allocations are set well below these limits. Therefore, the potential impacts of the No Action ABC, as well as the updated ABC values under the preferred alternative are low negative on non-target species since they will be affected by scallop fishing to some degree. However, the projected catches of non-target species for the range of specifications considered are lower than associated sub-ACL allocations for all bycatch species with the exception of one (**Table 122**). The projection of SNE/MA YT is just above the sub-ACL, but the total ACL has reduced substantially since the last assessment. The proposed ABC may have low negative to neutral impacts compared to No Action since the limit is higher, but in reality allocations are set well below these limits. The direct impacts of the fishery allocations are assessed in Section 5.5.2 below.

5.5.2 Fishery specifications

Specification alternatives 1- 5 are primarily compared in terms of their impacts to non-target species and other fisheries using several sources of information: 1) the projected bottom area swept values from the SAMS model simulations (Section 5.1.2.1.5); and 2) projected catch estimates. Alternative 3a is preferred.

The area swept estimates are closely related to the LPUE estimates. Generally, scenarios with higher LPUE have lower area swept, and scenarios with lower LPUE have higher area swept. The Scallop PDT also estimated the projected catch of the three sub-ACLs allocated to the scallop fishery: GB yellowtail flounder, SNE/MA yellowtail flounder, and SNE/MA windowpane flounder. In addition, the PDT also estimated the projected catch of northern windowpane flounder and CC/GOM YT because the Groundfish PDT requested those estimates be prepared as well for Groundfish Framework 55 analyses.

Appendix I summarizes the methods used and projected bycatch values for all the specification alternatives. When considering these estimates it is important keep in mind that bycatch projections are complex because they combine not only projections of future scallop biomass, but also projections of biomass for bycatch species, bycatch rates, and assumptions of future fishing behavior in terms of spatial and temporal fishing patterns. Therefore, the projected bycatch estimates are helpful for providing a potential catch estimate, but these estimates should not be considered a precise prediction of actual bycatch in a future fishing year.

- **Area swept**

The specifications under consideration in this action have estimates of area swept all below the overall estimates for the fishery in recent years. The range under consideration in this action is about 2,300 square nautical miles for No Action and up to 3,600 square nautical miles for Alternative 4 (ETA extension) (Figure 55). Framework 26 estimated total area swept to be about 2,300 square nautical miles in 2015, Framework 25 estimated about 2,800 square nautical miles in 2014, and Framework 24 estimated 2013 to be about 4,000 square nautical miles for under proposed fishery specifications. Therefore, the range of total estimated area swept for the fishery

in 2016 is similar to recent years, and has been declining overall under area rotation. Therefore, in terms of potential impacts on non-target species from scallop fishing, all the alternatives under consideration have potentially similar associated impacts compared to recent fishing years since the estimates of area swept for all alternatives are similar to lower than recent years. The less area covered by the fishery, the lower the potential bycatch and associated impacts on non-target species.

- **Projected catch of YT and WP**

The Scallop PDT estimated the scallop fishery's projected catches of the three groundfish stocks with sub-ACL allocations as well as northern WP flounder and CC/GOM YT (Table 121). The methods used are explained in Appendix I. After the Council selected final preferred alternatives the PDT prepared the final bycatch projections for the combined measures for LA and LAGC specifications; those estimates have been included in the table below as Alternative 3a. Note that a range for SNE/MA YT has been included to reflect the potential for highgrading in NL. If highgrading behavior occurs there could be increased impacts on bycatch. The 2016 sub-ACL allocation for GB YT is 42 mt, 32mt for SNE/MA YT and 209 mt for SNE/MA WP (Table 122).

Table 121 – Bycatch projections in metric tons for the scallop specification alternatives in Framework 27 (Alternative 3a is the preferred alternative)

	Alternative 1 - No Action				
	GB YT	SNE/MA YT	CC/GOM YT*	N. WP	S.WP
2016	19	28.7	6.3	73.4	127.2
2017	28.6	38.4	8	90.8	147.6
2018	26	40.2	7.8	90.1	140.2
	Alternative 2 - Base Run				
	GB YT	SNE/MA YT	CC/GOM YT*	N. WP	S.WP
2016	38.7	37.2	7.8	108.5	169.3
2017	28.9	38.9	8.1	91.7	150.3
2018	26.2	40.4	7.9	90.7	141.5
	Alternative 3 - Close Open Area south of CA2				
	GB YT	SNE/MA YT	CC/GOM YT*	N. WP	S.WP
2016	29.9	37.6	7.8	105.8	170.6
2017	26.5	40.4	8.5	94	154.6
2018	26.4	43.9	8	91.9	145.5
Pref.	***Alternative 3a - Close Open Area south of CA2, Shift CA2 trips, LAGC in NL***				
	GB YT	SNE/MA YT	CC/GOM YT*	N. WP	S.WP
2016	15.1	38.0 - 38.6	7.8	88.1	179.2
2017	26.3	40.4	8.5	93.8	160.6
2018	26.2	43.9	8.0	89.6	156.7
	Alternative 5 - Allow limited access in northern part of NL				
	GB YT	SNE/MA YT	CC/GOM YT*	N. WP	S.WP
2016	38.7	38.3-40.6	7.8	108.5	183.1-213.9
2017	28.9	38.9	8.1	91.7	150.3
2018	26.2	40.5	7.9	90.7	141.5

** The projection of CC/GOM YT only includes a portion of the total expected CC/GOM YT catch in the scallop fishery. This projection is only from a portion of one SAMS area (great south channel) that overlaps with the CC/GOM YT stock area, because the scallop projection model does not include the GOM. Bycatch rates are higher in the GOM compared to this area based on observer data. The most recent estimate of CC/GOM bycatch in the scallop fishery is 28.6 mt (2014). That is probably the value that should be used as a total projection of CC/GOM YT catch.*

Table 122 – Comparison of projected catches and sub-ACLs for 2016

	GB YT	SNE/MA YT	So. WP
2016 sub-ACL	**43**	**32**	**209**
Pref Alt	**15.1**	**38.0 – 38.6**	**179.2**
% of sub-ACL	**36.0%**	**118.8% - 120.6%**	**85.7%**

All of the alternatives under consideration are expected to have similar amounts of non-target bycatch since the overall allocations are relatively similar in terms of fishery allocations, with the exception of No Action. The No Action alternative would have lower catches of bycatch because it only includes reduced DAS allocations and the equivalent of one access area trip. However, this alternative also has the lowest scallop landings associated with the allocations. Since all the other specification alternatives include access area landings and DAS, they all have potentially higher catch of non-target species compared to the No Action specifications.

The projected catches of the preferred scallop specification alternative, Alternative 3a, are below associated sub-ACLs for GB YT and S.WP, but above the sub-ACL for SNE/MA YT (Table 122). GB YT catches are lowest with this alternative because it closes a new area south of CA2 and keeps the scallop access area in CA2 closed, shifting those trips to MAAA instead. The projected catch of GB YT is less than 40% of the allocated sub-ACL, so the risks of exceeding that sub-ACL are low. The projected catch of S. WP is about 85% of the sub-ACL and the projected catch of SNE/MA YT is higher than the sub-ACL, about 120%. Therefore, there is a greater chance of that sub-ACL being exceeded if bycatch rates are similar to what they have been more recently.

Overall, the potential impacts on non-target species is expected to be neutral for all the specification alternatives under consideration compared to recent years, and low negative compared to No Action since the allocations levels are very reduced under that alternative.

5.5.3 Allocation method for LA access areas

This action considered three alternatives for the method of allocating access areas to LA FT vessels: No Action (equal allocation per area); lottery allocation if NL is closed (lottery for the third trip in MAAA and CA2); and lottery allocation if NL is open to the LA fleet (lottery for the third trip in MAAA, CA2, and NL-north). No Action could have low negative impacts on bycatch species in the MA because it would have more overall fishing in MAAA compared to the other alternatives that include lottery trips in GB access areas. Options 2 and 3 could have low negative impacts compared to No Action on northern bycatch stocks (GB YT, SNE/MA YT, and N. WP) because those options include LA trips in CA2 south and NL-north. The potential differences in bycatch are summarized in **Table 121**, Lottery Option 1 includes access in CA2, and Lottery Option 2 includes some access in NL as well.

5.5.4 Allocation of LAGC IFQ trips in access areas

These options consider how to allocate access area trips to the LAGC fishery during 2016 (the preferred allocation option is Option 2), and in what areas (the preferred area option is Option 3). The options that allocate more access in MA access areas (Allocation Option 2, followed by Option 4, then Option 3, and finally Option 1) could increase effort in the Mid-Atlantic if vessels from ports farther north decide to relocate and fish those access areas instead of open areas farther north. This could have negative impacts on non-target species in the MA compared to alternatives that allocate less potential access in MA access areas. However, as noted in the scallop resource impacts section, if LAGC trips are not taken in the access areas, LAGC catch is assumed to come from open areas instead. This could result in lower or higher catch efficiency relative to the access area trips, depending on the open area fished and the resource conditions there.

The preferred alternative includes some access in NL-north for LAGC vessels. This will potentially increase bycatch of SNE/MA YT since NL is an area that traditionally has higher bycatch rates compared to other areas. However, the projected increase in SNE/MA YT is relatively minor, about 1mt total. SNE/MA YT is also caught in open areas, so it is difficult to know if more or less SNE/MA YT will be caught or not, it depends on how fishing effort would shift. Overall, LAGC catch in access areas is a small percentage of the overall catch and vessels tend to fish where catch rates are higher, so if they are higher in access areas most trips should be fished there, and if they are not more LAGC catch could come from open areas. This means that while the access area allocation options may increase flexibility for LAGC vessels in terms of where they can fish, impacts to non-target species (and the resource) are likely to be similar for all options, including No Action.

5.5.5 Additional measures to reduce impacts on small scallops

This action is considering three alternatives for this issue, in addition to the specific area closures considered in the overall specifications alternatives. Alternative 1(No Action) would prohibit vessels from fishing RSA compensation in access areas. Alternative 2 is status quo related to RSA fishing, which allows compensation in any area open to the fishery. Finally, Alternative 3 would prohibit RSA compensation fishing in NL north, but allow it in any other area open to the fishery.

Under Alternative 1 RSA compensation fishing would be restricted to open areas only. This could have low negative to low positive impacts on non-target species. Impacts could be low negative if catch rates are lower in open areas and vessels have to fish longer to attain the compensation pounds, higher area swept could have negative impacts on non-target species. However, there could be low positive impacts on bycatch species that are more abundant in access areas, such as SNE/MA YT in NL and GB YT in CA2. For the most part S.WP is distributed in waters shallower than MAAA, so would be more likely to interact with scallop fishing in MA open areas. Alternative 2 should have neutral impacts on non-target species and Alternative 3 should have low positive impacts on SNE/MA YT by keeping that area closed to RSA compensation fishing.

Overall impacts on non-target species are expected to be generally neutral from all these alternatives because the RSA compensation fishing effort is a relatively small proportion of overall scallop fishing effort, about 2.7% this fishing year (1.25 million pounds out of 47 million pounds).

5.6 CUMULATIVE EFFECTS

5.6.1 Introduction

The Council on Environmental Quality (CEQ) and agency policy (NOAA Administrative Order 216-6) require a cumulative effects assessment (CEA) as part of an EIS or EA. CEQ regulations (40 CFR Part 1508.7) define the term "cumulative effects" as: "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."
In other words, the purpose of the CEA is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately.

CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but rather, the intent is to focus on those effects that are truly meaningful.

This section examines the potential direct and indirect effects of the preferred alternatives in Framework 27 together with past, present, and reasonably foreseeable future actions that affect the human environment. These predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

Valued Ecosystem Components (VEC)

The Affected Environment (Section 4.0) identified and described the following VECs considered in this action and CEA:

1. Atlantic sea scallop resource;
2. Physical environment and essential fish habitat (EFH);
3. Protected resources;
4. Human communities (includes economic and social effects on the fishery and fishing communities); and
5. Non-target species

Temporal Scope of the VECs

While the effects of historical fisheries are considered, the temporal scope of past and present actions for scallop resource and non-target species is primarily focused on actions that have taken place since implementation of the initial Atlantic Sea Scallop FMP in 1982. The temporal scope for the human communities VEC extends back to 1994. This is when Amendment 4 first adopted a limited entry program which had distributional impacts on individuals and port that participated in the scallop fishery. For protected resources, the temporal context focuses back to the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ thereby creating a baseline for current stock assessments. Finally, for the physical environment and EFH, the temporal context focuses back to 1996 when the Magnuson-Stevens Act was reauthorized and included specific requirements to describe and identify essential fish habitat in each FMP.

The temporal scope of future actions for all VECs extends five years into the future (2020). This period was chosen because the dynamic nature of resource management and the lack of specific information on future projects make it difficult to predict impacts beyond this timeframe.

Geographic Scope of the VECs

The geographic scope of the analysis of impacts to the scallop resource, non-target species and habitat for this action is the total range of these VECs in the Western Atlantic Ocean, as described in the Affected Environment section of the document (Section 4.0). The physical range of the Atlantic sea scallop resource in northeast region of the United States ranges from Maine to North Carolina. The physical environment, including habitat and EFH, is bounded by the range of the Atlantic sea scallop fishery in the northeast region from Maine to North Carolina and includes adjacent upland areas (from which non-fishing impacts may originate). For endangered and protected species, the geographic range is the total range of each species (Section 4.3).

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resources, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. Therefore, the geographic range for the human communities is defined as those fishing communities bordering the range of the scallop fishery (Section 4.4) from the U.S.-Canada border to, and including, North Carolina.

Analysis of Total Cumulative Effects

The cumulative effects assessment of an EA ideally makes effect determinations based on the culmination of three elements:

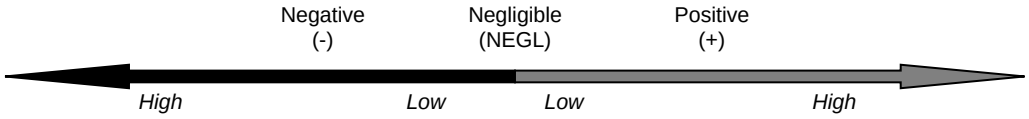
(1) impacts from past, present and reasonably foreseeable future actions; PLUS
(2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); PLUS
(3) impacts from the preferred alternatives.

Table 124 presents a description of past, present and reasonably foreseeable future actions. The baseline conditions of the resources and human community are subsequently summarized although it is important to note that beyond the stocks managed under this FMP and protected species, quantitative metrics for the baseline conditions are not available. Finally, this section includes a brief summary of the impacts from the alternatives contained in this framework. The culmination of all these factors is considered when making the cumulative effects assessment.

To enhance the clarity and maintain consistency this EA evaluates impacts using the definitions and qualifiers outlined in Table 123.

Table 123 – Impact definitions for cumulative effects analyses

VEC	Direction		
	Positive (+)	**Negative (-)**	**Negligible/Neutral (0)**
Allocated target species, other landed species, bycatch, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
All VECs: Mixed	**both positive and negative**		
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



5.6.2 Past, present and reasonably foreseeable future actions

The following is a synopsis of the most applicable past, present, and reasonably foreseeable future actions that have the potential to interact with the current action (Table 124). For a complete historical list of this past, present, and reasonably foreseeable future actions, please see Amendment 15 – the last EIS developed for the Atlantic Sea Scallop FMP.

Section 4.0 of this document summarizes the current state of the scallop resource and the limited access and general category scallop fisheries, and it provides additional information about habitat, protected resources and non-target species that may be affected by the Preferred Alternative.

Table 124. Summary of Effects on VECs from, Past, Present, and Reasonably Foreseeable Future FMP and Other Fishery Related Actions

Actions	Scallop Resource	Habitat/ EFH	Protected Resources	Human Communities	Non-Target species
Past and Present Fishing Actions					
Scallop FMP (1982)- sought to restore adult scallop stock and reduce fluctuation in stock abundance	+	+	+	+	+
Scallop Amendment 4 (1994) - implemented a limited access program. Qualifying vessels were assigned DAS limits according to which permit category they qualified for: full-time, part-time or occasional. Also included new gear regulations to improve size selection and reduce bycatch, a vessel monitoring system, and an open access general category scallop permit.	+	+	+	Mixed	+
Amendment 7 (1998) - changed the overfishing definition, the day-at-sea schedule, and lowered mortality targets. Also established two new scallop closed areas (Hudson Canyon and VA/NC Areas) in the Mid-Atlantic to protect concentrations of small scallops until they reached a larger size.	+	+	+	+	+
Framework 11 (1999) - allowed the first scallop fishing within portions of the Georges Bank groundfish closed areas since 1994. This successful "experiment" with closing an area and reopening it for controlled scallop fishing further motivated the Council to shift overall scallop management to an area rotational system	+	+	+	H+	0
Amendment 10 (2004) - implemented a series of year-round closed areas to scallop gear to protect EFH in those areas. Furthermore, a gear modification (4-inch ring size) was implemented to reduce mortality on small scallops and reduce contact with the bottom. Total DAS allocated under Amendment 10 were reduced, which had indirect benefits to EFH by reducing overall scallop fishing effort and thus reducing area swept by dredge gear. It should be noted that sea scallop EFH is not considered adversely affected by dredge or otter trawl fishing effort.	+	+	+	+	+
Amendment 11 (2008) - implemented a limited entry program for the general category fishery to control capacity and mortality. Each qualifying vessel received an individual allocation in pounds of scallop meat with a possession limit of 400 pounds. The fleet of qualifying vessels receives a total allocation of 5% of the total projected (LA and LAGC) scallop catch each fishing year. Also established separate limited entry programs for general category fishing in the Northern Gulf of Maine, limited access scallop fleet fishing under general category rules, and an incidental catch permit category.	+	+	+	Mixed	+
Amendment 15 (2011) - Implemented ACLs and AMs to prevent overfishing of scallops and yellowtail flounder; addressed excess capacity in the LA scallop fishery; and adjusted several aspects of the overall program to make the Scallop FMP more effective, including making the EFH closed areas consistent under both the scallop and groundfish FMPs for scallop vessels.	+	+	L- to L+	L+	+
Framework 23 (2012) - required a turtle deflector dredge to minimize impacts of the scallop fishery on sea turtles.	L+	0	+	L- to L+	0
Amendment 13 to the Multispecies FMP (2004) - implemented a range of measures to minimize the impacts of bottom trawling in the GOM, GB and SNE. Closed 2,811 square nautical miles (Habitat Closed Areas) to all bottom-tending mobile fishing gear, including scallop dredges	Mixed	+	0	Mixed	+

Actions	Scallop Resource	Habitat/ EFH	Protected Resources	Human Communities	Non-Target species
Amendment 16 to the Multispecies FMP (2010) - identified a process for setting annual catch limits (ACLs) for all groundfish species. A sub-ACL will apply to all scallop fishery catches of yellowtail flounder.	0	+	0	Mixed	+
Framework 44 to the Multispecies FMP (2010) - provided an incentive for scallop fishermen to reduce their YT bycatch in order to maximize scallop yield. Required that all limited access vessels be required to land all legal-sized yellowtail flounder, which will improve data quality.	0	0	0	L+	L- to L+
Framework 47 to the Multispecies FMP (2012) - removed the cap that limited the catches of yellowtail flounder in the Georges Bank access areas to 10 percent of the ACL. Implemented AMs for the scallop fishery if the overall ACLs for either Georges Bank or SNE/MA are exceeded or, if the total ACL for a given broad stock area is not exceeded but the scallop fishery exceeds its sub-ACL for that area by 50 percent or more. Enabled an in-season yellowtail flounder transfer to the groundfish fishery.	0	0	0	L- to L+	+
Framework 48 to the Multispecies FMP (2013) - implemented a sub-ACL for southern windowpane flounder to the scallop fishery, sub-ACL allocation of GB YT for the scallop fishery: 40% of the US ACL in 2013, and a set allocation of 16% for future years.	0	0	0	0	+
Framework 51 and 52 to the Multispecies FMP (2013 and 2014) – revised rebuilding programs for several GF stocks and revised annual catch limits, prohibit possession of YT by LA scallop fishery.	0	0	0	L- to L+	L- to L+
Reasonably Foreseeable Future Fishing Actions					
Omnibus Essential Fish Habitat Amendment (2016)- Updates EFH and HAPC designations, Considers the effects of fishing gear on EFH and includes measures to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. Further, it reconsiders existing closures put in place to protect EFH and groundfish mortality in the Northeast Region.	Likely 0	Likely +	Likely 0	Likely +	Likely +
Amendment 19 (2016) - will implement a specification setting process and modify the start of the fishing year to April 1	L+	0 / L+	+	L+	0
Framework 28 (2017) - will set specifications for fishing years 2017 and default measures for 2018.	Likely +	ND	ND	ND	ND
Framework 55 to the Multispecies FMP (2016) – set ACLs for GF stocks	0	0	0	L- to L+	L- to L+
Atlantic Trawl Rule- would require the use of TEDs in trawl fisheries off the Northeast coast including the scallop trawl fishery	ND	ND	ND	ND	ND

Note: ND = Not determined

Scallop Resource

The cumulative impacts of past, present, and reasonably foreseeable future management actions have resulted in substantial effort reductions in the scallop fishery. Sea scallop biomass increased considerably between from 1998 to 2004, and has been fairly steady since then, with modest decreases in 2013 and 2014, and large increases in juvenile biomass in 2015. The resource was declared rebuilt in 2001, and has not been considered overfished since then. Overfishing has not been considered to be occurring since 2005, although it has been very close during a few years since 2005. It is estimated that area rotation management and allocating effort using ACL management will continue to prevent overfishing and provide a healthy

resource for the scallop industry and nation for the long-term. In general, the actions in the foreseeable future are expected to have positive impacts on the scallop resource overall. In summary, the cumulative impacts of past, present and reasonably foreseeable future actions are positive for the scallop resource.

Physical Environment and EFH

Mobile bottom-tending gear (trawls and dredges) reduce the bottom habitat complexity (NRC 2002). When repeated over the long term trawling and dredging can also result in discernible changes in benthic communities and can result in loss of benthic productivity and thus biomass available for fish. These effects vary with sediment type. Sandy communities experience lower levels of negative effects given inherently lower susceptibility to impact, and are expected to recover more quickly from disturbance in areas of higher natural disturbance where biological communities are adapted to a dynamic environment. Hard-bottom areas such as bedrock, cobble and coarse gravel are more susceptible to negative impacts associated with mobile bottom-tending gear fishing. Recovery times may be longer particularly in less dynamic environments where the substrate and attached epifauna are more stable.

The primary gear used in the scallop fishery is dredge gear; however, there is some limited use of otter trawl gear. It is assumed for this analysis that the effects of mobile bottom-tending gear, particularly dredge gear, are generally moderate to high, depending upon the type of bottom and the frequency of fishing activities to demersal species affected by this action. These activities, which cause impacts to essential fish habitat for a number of federally managed species in a manner that is more than minimal and less than temporary in nature, have been mitigated by the measures in Amendment 10, including a suite of habitat closure areas where these gears are prohibited, and other actions that have reduced fishing effort and increased efficiency. If approved by NMFS, the EFH Omnibus Amendment will implement a new suite of measures to minimize impacts on habitat and EFH overall, including in portions of the northeast region where the scallop fishery is active. Thus positive impacts are expected from this future action. Overall, the combination of past, present and reasonably foreseeable future actions is expected to improve protection for vulnerable benthic habitats, and continue to promote efficiency in the harvest of fishery resources, thereby reducing adverse effects of fishing on EFH. Also, the updated EFH designations in the EFH Omnibus Amendment should facilitate agency consultations on non-fishing projects. Such consultations aim to reduce the negative habitat impacts associated with various activities occurring in the marine environment. However, despite these mitigation measures, it is likely that fishing and non-fishing activities will continue to degrade habitat quality.

Protected Species

The primary protected species impacted by the scallop fishery is sea turtles. The sea scallop FMP has several measures that minimize impacts on sea turtles. A gear modification called turtle chains was implemented in 2006 to minimize impact of takes. General reductions in scallop fishing have also reduced takes. In general, scallop effort has declined (e.g., reduced DAS allocations and access area trips) over the years and catch per-unit-of-effort has increased dramatically under area rotation, implemented through Amendment 10 in 2004. In more recent years scallop effort has shifted from the Mid-Atlantic region to areas of Georges Bank, which may have had the effect of reducing potential risks to sea turtles. As the Georges Bank scallop resource is reduced and the Mid-Atlantic areas rebound a reverse shift in effort from an area of low use for turtles to high use areas in the Mid-Atlantic may potentially increase the risk of

interactions from current levels. Accordingly, impacts to protected species could shift back and forth over the years under the management scheme implemented under Amendment 10. Since modifications to NEFMC management actions will occur through framework adjustments and plan amendments, they will undergo additional review to assess impacts to protected species.

Finally, FW23 to the Scallop FMP required all dredges greater than 10 feet 6 inches fishing in the Mid-Atlantic from May-October to use a turtle deflector dredge (TDD). The key elements of the turtle deflector dredge are: a forward cutting bar, a reduced number of bale bars, and reduced spacing of struts. All these elements are expected to reduce the likelihood of a turtle passing under the dredge frame and getting stuck in the dredge frame.

Other non-scallop fishery actions that have been implemented over the last decade to protect sea turtles include: requiring turtle excluder devices (TEDs) in summer flounder trawls, gillnet mesh-size regulations, prohibitions on the use of pound net leaders, hook and bait requirements for pelagic longline gear, and regulations regarding how to handle sea turtles in such a manner as to prevent injury.

Overall, the cumulative impacts of past, present and reasonably foreseeable future actions are positive for protected resources, due to reduced gear interactions with sea turtles.

Human Communities

All actions taken under the Scallop FMP have had effects on human communities. None have specifically been developed to primarily address elements of fishing related businesses and communities, but many actions have included specific measures designed to improve flexibility and efficiency. In general, actions that prevent overfishing have long-term economic benefits on businesses and communities that depend on those resources. Some actions that limit participation, such as the limited entry program that was adopted under Amendment 4 and Amendment 11 for the general category fishery had distributional impacts on individuals and ports that participated in the scallop fishery at that time. While short-term negative impacts may follow an action that reduces effort, past and present actions had positive cumulative impacts on vessel owners, crew and their families in the scallop fishery by increasing their fishing revenues, incomes and standard of living. The impacts of these past and present actions were also positive for the related sectors including dealers, processors, primary suppliers to the vessels that sell them gear, engines, boats, etc. The increases in gross profits for scallop vessels and in crew incomes have had positive economic benefits on these sectors indirectly through the multiplier impacts. Total landings have increased, catch per unit of effort has increased, and price has steadily increased as well. Future actions are expected to continue this trend. Therefore, the cumulative impacts of past, present and reasonably foreseeable future actions are positive for human communities.

Non-target Species

Actions taken by the Council in the Scallop FMP in the past and present are mostly positive on non-target species. Specific gear and area restrictions have reduced bycatch of various non-target species. Effort controls and increased efficiency of the fleet have also likely reduced impacts on non-target species. However, some non-target species are still overfished (see Table 127). Future actions are anticipated to continue rebuilding and maintaining sustainable stocks. There are several stocks that have been allocated a sub-ACL as bycatch in the scallop fishery (GB YT, SNE/MA YT and SNE/MA windowpane flounder). Having a sub-ACL and AMs

likely reduces overall bycatch of these stocks in the scallop fishery. Therefore, the cumulative impacts of past, present and reasonably foreseeable future actions should yield positive impacts for non-target species in the long-term.

5.6.2.1 Non-fishing Impacts

Non-fishing activities were also considered when determining the combined effects from past, present and reasonably foreseeable future actions. Activities that have meaningful effects on the VECs include the introduction of chemical pollutants, sewage, changes in water temperature, ocean acidification, salinity, dissolved oxygen, and suspended sediment into the marine environment. These activities pose a risk to the all of the identified VECs in the long term. Human induced non-fishing activities that affect the VECs under consideration in this document tend to be concentrated in near shore areas. Examples of these activities include, but are not limited to, agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material. Because inshore and coastal areas support essential egg, larval and juvenile scallop habitats, it is likely that the potential threats to inshore and coastal habitats are of greater importance to the species than threats to offshore habitats. It is also likely that these inshore activities will continue to grow in importance in the future. There is more and more evidence that changes in water quality resulting from increasing acidification and water temperature could have potentially negative cumulative impacts on the scallop resource and fishery.

Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the scallop resource, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. This action is not expected to change the impacts on the VECs described above from non-fishing impacts. The Council has recently added a specific research priority to the Scallop RSA program that would support research in this subject. Specifically, proposals focused on research aimed at the effects of chemicals, water quality, and other environmental stressors on reproduction and growth of scallops is now in the "medium" priority category. Hopefully future research proposals will be submitted related to this subject to improve the current understanding of these potential impacts on the scallop resource and fishery.

Table 125 summarizes non-fishing impacts applicable to this action.

Table 125 - Summary of effects from non-fishing activities

Action	Description	Impacts on Scallops	Impacts on Habitat	Impacts on Protected Resources	Impacts on Human Communities	Impacts on Non-target species
P,Pr,RFFA Near shore non-fishing activities	These activities include, but are not limited to agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material.	**Negative at Site-** impacts primarily inshore	**Likely Negative Inshore** – may lead to destruction of habitat	**Negative at Site** – inshore species impacted by reduced water quality	**Likely Negative** - loss of fishing opportunities may occur	**Negative at Site** – inshore species impacted by reduced water quality
P, Pr, RFFA Oil and gas exploration/ development	General exploration and development, as well as hydrocarbon spills associated with the transportation, loading and offloading	**Likely negative –** no data	**Likely negative –** may lead to destruction of habitat	**Likely negative –** no data	**Likely negative –** no data	**Likely negative –** no data

Action	Description	Impacts on Scallops	Impacts on Habitat	Impacts on Protected Resources	Impacts on Human Communities	Impacts on Non-target species
	of oil and gas products					
P, Pr, RFFA Exotic Species	Introduction of non-indigenous and reared species	**Likely Negative**- while no direct evidence exists, it is likely that invasive species may affect overall ecosystem health and the biomass of marketable species	**Likely Negative**- exotic species (ex., tunicates) found to adversely impact EFH and displace marketable and forage species	**Likely Negative**– ecosystem effects of non-native species	**Likely Negative**- while no direct evidence exists, it is likely that invasive species may affect overall ecosystem health and the biomass of marketable species	**Likely Negative**– ecosystem effects of non-native species
RFFA Liquefied Natural Gas (LNG) terminals & Offshore Wind Energy Facilities	Transportation of natural gas via tanker to terminals located offshore and onshore, Construction of wind turbines to harness electrical power	**Likely Negative**– short-term disruption of habitat during construction could negatively impact organisms	**Negative** - habitat negatively impacted during construction phase and due to increased vessel traffic. Offshore wind facilities could affect the distribution of fishing effort and thus habitat impacts.	**Negative** – may disrupt protected species during construction through increased noise and poor water quality	**Negative** - may restrict access to fishing areas **Positive –** location of LNG facilities offshore may protect or improve communities. Wind provides renewable clean energy	**Negative** – may disrupt species during construction through increased noise and poor water quality
P, Pr, RFFA Ocean acidification and warming	The acidification and warming of the Earth's oceans due to rising levels of carbon dioxide	**Likely Negative-** interferes with development, growth and survival of shellfish	**Likely Negative -** may cause ecosystem and food wed effects that affect the benthic environment, Direct negative impacts on pelagic habitats.	**Likely Negative-** changes in food webs may occur but are not well understood	**Likely Negative-** if loss of fishing opportunities occur	**Likely Negative-** changes in food webs may occur but are not well understood
SUMMARY OF IMPACTS OF NON-FISHING ACTIVITIES – Overall, impacts are variable but greatest on the physical environment and EFH but found to be low to moderately adverse; lack of data precludes more in-depth analysis of impacts on other VECs		**Likely Negative**	**Likely Negative**	**Likely Negative**	**Likely Negative**	**Likely Negative**

Table 126 summarizes the effects of past, present and reasonably foreseeable future fishing and non-fishing actions on the VECs identified for Framework 26.

Table 126 – Summary effects of past, present and reasonably foreseeable future fishing and non-fishing actions on the VECs identified for Framework 26

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Scallop Resource	**Positive** Combined effects of past actions have improved scallop biomass	**Positive** Current regulations continue to manage for a sustainable resource	**Positive** Future actions are anticipated to maintain a sustainable resource	**Positive** The scallop resource is rebuilt and sustainable stocks are expected to continue through current and future management
Physical Environment/ Habitat/EFH	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive. But fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Effort reductions and better control of non-fishing activities have been positive. But fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and thus habitat impacts. But fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Continued fisheries management will likely control effort and thus fishery related habitat impacts. But fishery and non-fishery related activities will continue to reduce habitat quality
Protected Resources	**Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Positive** Current regulations continue to control effort, thus reducing opportunities for interactions	**Positive** Future regulations will likely control effort and decrease interactions through gear modifications	**Positive** Continued effort controls along with past fishery regulations will likely help stabilize protected species interactions. Some negative impacts from non-fishery related activities, but additional protections in place for turtles outweigh these negative environmental factors from non-fishing activities.
Human Communities	**Positive** Fishery resources have been rebuilt to support profitable industries and communities	**Positive** Current regulations continue to manage for sustainable stocks and profitable industries	**Positive** As effort controls and rotation management are maintained or strengthened, economic impacts will be positive	**Positive** Sustainable resources should support viable communities and economies
Non-Target Species	**Mixed** Combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary. However, some stocks remain overfished	**Positive** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species	**Positive** Future actions are anticipated to continue rebuilding and strive to maintain sustainable stocks	**Short-term Negative** Several groundfish stocks are currently overfished, have overfishing occurring, or both **Long-Term Positive** Stocks are being managed to attain rebuilt status

Impact Definitions:

-Scallop resource, Non-target species, Endangered and Other Protected Species: positive=actions that increase stock size and negative=actions that decrease stock size

-Habitat: positive=actions that improve or reduce disturbance of habitat and negative=actions that degrade or increase disturbance of habitat

-Human Communities: positive=actions that increase revenue and well-being of fishermen and/or associated businesses and negative=actions that decrease revenue and well-being of fishermen and/or associated businesses

5.6.3 Baseline Conditions for Resources and Human Communities

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities is considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. Table 127 summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 5.7.2) and the sum effect of the past, present and reasonably foreseeable future actions (from **Table 126** above). The resulting CEA baseline for each VEC is exhibited in the last column (shaded). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECs are complex and varied. As such, the reader should refer to the characterizations given in Sections 5.2 and 5.4. As mentioned above, this cumulative effects baseline is then used to assess cumulative effects of the proposed management actions in Table 128.

Table 127. Cumulative effects assessment baseline conditions of the VECs

VEC		Status/ Trends, Overfishing Occurring	Status/ Trends, Overfished	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 3)	Combined CEA Baseline Conditions
Scallop Resource		No	No	**Positive** The scallop resource is rebuilt and sustainable stocks are expected to continue through current and future management	**Positive** The scallop resource is not overfished or experiencing overfishing. Stocks are being managed to retain this status
Habitat		Fishing impacts are complex and variable and typically adverse (see section 4.2); Non-fishing activities had historically negative but site-specific effects on habitat quality.		**Mixed** – future regulations will likely control effort and thus habitat impacts . But non-fishing activities occurring. An omnibus amendment to the FMP with mitigating habitat measures is under development.	**Mixed** - reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.
Protected Resources		Leatherback, Kemp's ridley and green sea turtles are classified as endangered under the ESA and loggerhead sea turtles are classified as threatened.		**Positive** – reduced gear encounters through gar modifications and additional management actions taken under the ESA.	**Positive** – reduced gear encounters through gar modifications and additional management actions taken under the ESA.
Human Communities		Fishery resources have been rebuilt to support profitable industries and communities		**Positive -** Sustainable resources should support viable communities and economies	**Positive -** Sustainable resources should support viable communities and economies
Non-Target Species		***Overfished?***	***Overfishing?***		
	GB Yellowtail Flounder	Unknown	Unknown	**Negative** – short term: Several stocks are currently overfished, have overfishing occurring, or both; **Positive** – long term: Stocks are being managed to attain rebuilt status. Continued management of directed stocks will also control incidental catch/bycatch	**Negative** – short term: Overharvesting in the past contributed to several stocks being overfished or where overfishing is occurring; **Positive –** long term: Regulatory actions taken over time have reduced fishing effort and with the addition, stocks are expected to rebuild in the future.
	SNE/MA Yellowtail Flounder	*Yes*	*Yes*		
	CC/GOM Yellowtail Flounder	*Yes*	*Yes*		
	GB Winter Flounder	*Yes*	*Yes*		
	GOM Winter Flounder	Unknown	No		
	SNE/MA Winter Flounder	*Yes*	No		
	Northern (GOM-GB) Windowpane Flounder	*Yes*	No		
	Southern (SNE-MA) Windowpane Flounder	No	No		
	Summer flounder (fluke)	No	*Yes*		
	Monkfish (Northern GB)	No	No		
	Monkfish (Southern GB/MA)	No	No		
	Barndoor skate	No	No		
	Clearnose skate	No	No		
	Little skate	No	No		
	Rosette skate	No	No		
	Smooth skate	No	No		
	Thorny skate	*Yes*	*Yes*		
	Winter skate	No	*Yes*		
	Atlantic Surfclam	No	No		
	Ocean Quahog	No	No		

5.7.4 Summary Effects of Framework 27 Actions

The alternatives contained in Framework 27 can be divided into two broad categories, as seen in Table 128 (summary of impacts from action – for a complete discussion of impacts please see Section 5.0 of document). First, this action set specifications for the different components of the scallop fishery in FY 2016 and default measures for FY2017. Second, the action considered a handful of other measures not directly related to specifications.

In general, the adoption of all of these measures will benefit the scallop resource because collectively they make it more likely that mortality targets are reasonable and will not be exceeded. The measures that constitute the Proposed Action (if based on the Preferred Alternatives) are designed to maintain the sustainability of the scallop resource. Overall the measures are expected to have negligible impacts on protected resources, non-target species, or habitat when compared to the No Action alternative. The specifications are likely to have positive impacts on communities in the short term and long term.

The estimate of SNE/MA YT catch associated with the specifications proposed in this action are projected to be above the 2016 sub-ACL allocation of that non-target species. In general, selecting an alternative that allocates scallop fishing effort with a high probability of exceeding its bycatch sub-ACL for a stock runs a greater risk of exceeding the overall ACL. This could have negative impacts on the bycatch stock and the GF fishery overall. It is important to note that bycatch projections are complex; they are based on variety of assumptions and in the last few years final catch estimates have been below projected catches in most cases.

The Council discussed that there may be more risk of exceeding the GB YT sub-ACL with the specification alternatives that increase scallop fishery DAS, but the Council selected an alternative that allocated fewer DAS. In addition, there are several measures in place that will help the fishery reduce overall YT catch. For example, the voluntary bycatch avoidance program has been expanded to include open areas as well as windowpane flounder. By expanding the spatial area and number of species included in the program, overall bycatch of non-target species may be reduced if vessels voluntarily move from areas with higher bycatch rates reported through the avoidance program. In addition, Closed Area II will remain closed in this action and an additional area is being closed south of CA2. Both areas have traditionally had more YT bycatch than other fishing areas, so overall GB YT catch is expected to be lower than recent years.

In addition, there are several gear modifications that some vessels are using voluntarily that have been shown to reduce flatfish bycatch. Specifically, shorter aprons and reduced hanging ratios have been documented to reduce flatfish bycatch substantially. Framework 26 required all dredge vessels from having more than seven rows of rings in the apron of their dredge in all waters west of 71° W, excluding access areas, as a proactive AM to reduce flatfish bycatch. Finally, GF FW51 again prohibited possession of YT for LA vessels. Prohibiting possession eliminates any incentive to target YT while fishing for scallops.

All of these measures combined are expected to reduce bycatch overall in the scallop fishery, thus FW27 specifications are expected to have likely negligible impacts on non-target species

and bycatch. Since all these measures are designed to help keep the fishery below the sub-ACL it is unlikely that the sub-ACL would be exceeded.

Table 128 – Summary of Impacts expected on the VECs

Management Measure	VECs				
	Managed Resources	**Habitat Including EFH**	**Protected Resources**	**Human Communities**	**Non-target Species**
OFL/ABC	**Low Positive-** Updated OFL/ABC based on best available science and should not lead to overfishing	**Low Negative to Neutral -** Updated OFL/ABC are higher than No Action, thus higher potential area swept, but specifications are set lower than ABC	**Low negative to Neutral -** measures are not expected to create additional impacts to Protected Resources	**Short Term-Positive Long term-Positive** Proposed ABC values are higher than No Action values and could have positive impacts on future fishery specifications	**Low negative to Neutral-** measures are not expected to create additional impacts to non-target species
OVERALL SPECIFICATIONS FOR LA AND LAGC VESSELS	**Positive** – Expected to prevent overfishing and maintain high total biomass, but total biomass even higher under No Action alternative	**Low negative to Low positive** – low negative impacts compared to No Action, but low positive compared to recent years (2012 and 2013) and other alternatives based on projected area swept estimates	**Low negative to Neutral** – low negative impacts compared to No Action, and neutral compared to recent years – similar Mid-Atlantic access area effort and slightly higher DAS allocations; therefore, potentially low negative, but maintaining inshore closure of ETA could have positive impacts	**Short Term-Positive Long term-low negative to Positive** Landings, revenues and net economic benefits will be higher than both the No Action and SQ levels. Long-term benefits higher compared to No Action but lower than SQ levels.	**Neutral to Low negative** – Overall, neutral impacts expected compared to recent years in terms of area swept and projected catches of bycatch are within sub-ACL limits (except for high estimate for SNE/MA YT), and low negative compared to No Action since the allocations levels are very reduced under that alternative.

ALLOCATION METHOD FOR LA ACCESS AREAS	**Low negative to low positive** – Depends on fleet behavior changes	**Low negative to low positive** – Depends on fleet behavior changes and resource conditions	**Low negative to low positive** – Depends on fleet behavior changes and resource conditions	**Short-term positive, long-term low negative to low positive –** Positive economic impacts on scallop vessels in the short-term by providing the flexibility to fish access areas trips in areas with the highest catch rates. Long-term impacts depend on fleet behavior and resource conditions.	**Low negative to low positive** – Depends on fleet behavior changes and resource conditions
ALLOCATION OF LAGC IFQ TRIPS IN ACCESS AREAS	**Neutral –** Overall LAGC effort small fraction of total effort, some access may help spread effort out compared to No Action (no access) and alternatives that provide less effort from access areas	**Neutral to Low positive –** Overall LAGC effort small fraction of total effort, some access may help spread effort in areas with higher catch rates, thus lower area swept	**Neutral to Low Positive –** Overall small proportion of effort so neutral impacts likely, low positive for options that allocate more access in NL-north since that area has lower potential for overlap with turtles	**Positive -** Would provide opportunity to LAGC vessels to fish in more productive areas reducing fishing costs and optimizing the size composition of their landings by selectively fishing in areas abundant with larger scallops.	**Neutral to low negative –** Overall LAGC effort small fraction of total effort, some access may help spread effort out compared to No Action (no access). Access in NL could increase SNE/MA YT catch if effort shifts from an area with lower bycatch rates
ADDITIONAL MEASURES TO REDUCE IMPACTS ON SMALL SCALLOPS (PROHIBIT RSA COMPENSATION FISHING IN NL ACCESS AREA)	**Low positive** – May reduce incidental and discard mortality on small scallops in that area, but overall not expected to have substantial effect	**Neutral –** Vessels expected to fish RSA compensation pounds in the areas with highest catch rates available, thus neutral impacts on EFH	**Neutral to low negative –** If unable to fish in NL more RSA compensation could be fished in an area with higher overlap with turtles, but overall the impact of RSA compensation fishing is low to neutral because it is a small fraction of overall fishing	**Short-term low negative, long-term positive –** Could increase costs by reducing the flexibility for vessels to fish in NL, but long-term economic benefits are expected to outweigh the short-term cost by increasing yield over the long-term from that area.	**Neutral to low positive**– Neutral since relatively small amount of fishing from RSA compensation, but low positive for SNE/MA YT if NL is closed to RSA fishing and effort shifts to areas with lower bycatch rates.

5.6.4 Cumulative Effects Analysis

The regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the M-S Act requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, **the overall cumulative effects of the preferred alternative on all VECs should yield non-significant neutral to low positive impacts**. This is not to say that some aspects of the various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is positive.

To determine the magnitude and extent of cumulative impacts of the preferred alternative, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those effects identified and discussed relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). Table 128 provides as a summary of likely cumulative effects found in the various groups of management alternatives contained in Framework 25. The CEA baseline that, as described above in Table 127, represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with the "other" actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The resultant positive and negative cumulative effects are described below for each VEC.

Scallop Resource

As noted in Table 127, the combined impacts of past federal fishery management actions have rebuilt the scallop resource and increased scallop biomass. For the most part, the actions proposed by FW 27 are expected to have low positive impacts and continue the sustainability of the scallop resource. The proposed ABC and fishery specifications in this action are well below the OFL and are expected to prevent overfishing. Setting sustainable ACLs and specifications will have positive impacts on the scallop resource over the long-term. The other measures proposed in this action are expected to have primarily neutral to low positive impacts on the scallop resource. Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (*i.e.*, past, present, and reasonably foreseeable future actions), **the cumulative effects should yield non-significant positive impacts on the scallop resource.**

Habitat, Including EFH

As noted in Table 127, the combined impacts of past federal fishery management actions have had positive impacts on EFH. In terms of reasonably foreseeable future actions, there are several EFH actions that may have potentially positive effects on EFH. In addition, better control of non-fishing activities has also been positive for habitat protection. However, both fishing and non-fishing activities continue to decrease habitat quality. None of the measures in FW 27 are

expected to have substantial impacts on habitat or EFH. The proposed specifications may result in similar or even reduced area swept compared to recent years, thereby providing some minor short-term benefits to habitat. Overall, the combination of past, present, and future actions is expected to reduce fishing effort and hence reduce damage to habitat; however, it is likely that fishing and non-fishing activities will continue to degrade habitat quality. The other measures proposed in this action are expected to have mostly neutral impacts on EFH. Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), **the cumulative effects should yield non-significant neutral impacts on habitat and EFH.**

Protected Resources

As noted in Table 127, the combined impacts of past federal fishery management actions have had positive to neutral effects on protected resources. However, sea turtles, have been, are, and will continue to be, negatively impacted by a variety of fishing and non-fishing activities. In terms of reasonably foreseeable future actions, there are several protected resource related actions that may have positive effects on protected resources. In addition, there are several reasonably foreseeable future scallop and other fishery-related actions that are expected to have potentially positive impacts on protected resources. The activities that are negatively impacting sea turtles will continue to be addressed through fishery management plans as well as by the agency to ensure sea turtles are protected. The direct and indirect effects of the measures under consideration in Framework 27 are expected to have low negative to low positive impacts on protected resources. The proposed specifications may lead to reduced area swept per catch, and thus reducing interactions with sea turtles, but more overall effort is expected in the Mid-Atlantic region compared to GB in 2016. The other measures proposed in this action are expected to have primarily neutral impacts on protected resources. Thus, when the direct and indirect effects of the alternatives are considered in combination with other actions (i.e., past, present, and reasonably foreseeable future actions), **the cumulative effects should yield non-significant neutral impacts on protected resources.**

Human Communities

As noted in Table 127 the past federal fishery management actions have adjusted open area DAS allocations, implemented trip limits and allocations for the access areas and rotation area management. These past actions have had positive impacts on the scallop industry by increasing the revenues, producer and consumer surpluses and net benefits.

The direct and indirect effects of the measures under consideration in Framework 27 are expected to be positive both in the short-term and over the long-term compared to No Action because prevention of overfishing will keep scallop stock biomass, catches and revenues at sustainable levels benefiting the communities engaged in scallop fishing and related industries. However, compared to Status Quo benefits, long-term benefits could be somewhat lower (Table 128).

The actions proposed by Framework 27 are expected to increase fleet revenues, profits and total economic benefits compared to No Action and Status Quo both in the short-term. The total economic benefits of the preferred alternative would exceed the No Action levels by $160.8 million and the SQ levels by $19.4 million in the 2016 fishing year in terms of current (2015)

prices. Therefore, net cumulative impacts of the proposed measures and the past actions on revenues and economic benefits from the scallop fishery would be positive in 2016 compared to both No Action and SQ levels. Over the long-term, present value of the cumulative benefits for the preferred alternative will exceed No Action levels by $49.6 million ($33.8 million) using a 7% (3%) discount rate. However, Status Quo scenario provides a better baseline for the estimation of impacts on the economy for the reasons discussed in Section 5.4.2. Over the long-term, present value of the cumulative benefits for the preferred alternative will be lower than Status Quo levels by $25.7 million ($35.6 million) using a 7% (3%) discount rate. However, long-term benefits from past actions were estimated to outweigh a decline in benefits compared to status quo. As a result, long-term cumulative economic benefits, which measure the sum of benefits from previous and preferred alternatives, are expected to be positive.

In terms of reasonably foreseeable future actions, there is one scallop related action that is expected to have positive impacts overall, Framework 27 and several other actions related to EFH and protected resources that may have impacts that are not determined yet but could be potentially low positive or low negative on fishery-related businesses and communities. Therefore, the overall effects of reasonably foreseeable future actions on the fishery-related businesses and communities are neutral (Table 128). In addition, the effects of non-fishing activities on the fishery-related businesses and communities are mostly potentially negative (**Table 125**).

In summary, when the direct and indirect effects of the alternatives are considered in combination with other actions (*i.e.*, past, present, and reasonably foreseeable future actions), **these actions yield potentially positive cumulative impacts on the fishery-related businesses and communities.**

Non-Target Species

As noted in Table 127, the combined impacts of past federal fishery management actions have decreased effort and improved habitat protection, which benefits non-target species. In addition, current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species. The actions proposed by Framework 27 are expected to continue this trend. Finally, future actions are anticipated to continue rebuilding and thus limit the take of discards/bycatch in the scallop fishery, particularly through ACL management with AMs. The other measures proposed in this action are expected to have primarily neutral impacts on non-target species. Overall, continued management of directed stocks will also control catch of non-target species. In addition, the effects of non-fishing activities on bycatch are potentially negative. **Overall, the cumulative effects should yield non-significant neutral impacts on non-target species.**

Table 129 - Summary of cumulative effects of the preferred alternative

	Scallop Resource	Physical Habitat/EFH	Protected Resources	Human Communities	Non-Target Species
Direct/Indirect Impacts of Preferred Alternative	Likely Positive	Neutral	Neutral	Likely Positive to Neutral	Neutral
Combined Cumulative Effects Assessment Baseline Conditions	Positive	Mixed	Positive	Positive	Short term Negative Long-term Positive
Cumulative Effects	Non-significant Positive	Non-significant Neutral	Non-significant Neutral	Non-significant Positive	Non-significant Neutral

6.0 COMPLIANCE WITH APPLICABLE LAW

6.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

6.1.1 National standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans (FMPs) contain conservation and management measures that are consistent with the ten National Standards:

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The OFL/ABC/ACLs developed in this action are consistent with the ACL structure adopted under Amendment 15 to prevent overfishing and achieve optimum yield. Specifically, OFL is set at Fmsy (0.48 based on the most recent benchmark assessment) and the ABC control rule sets ABC at the F rate estimated to have a 25% change of exceeding OFL (0.38). In the Scallop FMP ACL is equivalent to ABC, after removing discard and incidental mortality, and the overall fishery allocations (ACT) are set at or below the fishing level estimated to have a 25% chance of exceeding ABC, which is currently 0.34 for this fishery.

This action included six overall specification alternatives. They are all slightly different in terms of the days-at-sea allocations for the limited access fishery and level of access in several scallop access areas. The No Action alternative includes a reduced level of DAS and the equivalent of one access area trip, default measures set in Framework 26. Alternatives 2 allocations are based on three principles used in this fishery to set target catches. Alternative 3 considered several different closed areas to protect small scallops. Alternative 3a, the preferred alternative, included several closed areas to protect small scallops and restricted access in the Mid-Atlantic Access areas only for LA vessels. Alternative 4 included an extension of a closed area within ETA. And Alternative 5 considered some access in the northern part of NL for both LA and LAGC vessels.

The preferred alternative, Alternative 3a, has an overall estimate of F of 0.11. Since this level is well below the thresholds set in this plan these specifications are expected to prevent overfishing and achieve optimum yield on a continuing basis. The preferred alternative projects 46.9 million pounds in total landings for FY2016, which is higher than No Action, but lower than other alternatives considered in this action.

All specification alternatives have the same LAGC allocations (IFQ, NGOM and Incidental permits). The LAGC IFQ is the same since it is based on the total ACL for the fishery, which is the same under all alternatives. The LAGC sub-ACL for this action is 2,029mt, an increase compared to recent years.

In this action the Council had available updated estimates of fishing mortality from the recent benchmark assessment through 2013 (SARC 59) as well as recent surveys conducted in 2015. Section 4.1 includes a summary of the recent assessment, status of the fishery, and updated survey results. Total biomass was estimated to be 133,000 mt in 2013 and overall F was estimated at 0.32. That biomass estimate is well above the overfishing threshold of 48,240 mt, and the overfished threshold of 0.48 (OFL). **Therefore, overfishing is not occurring and this resource is not overfished**.

(2) Conservation and management measures shall be based upon the best scientific information available.

This document uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several sources of data were used in the development of this document. These data sources include, but are not limited to: permit data, landings data from vessel trip reports, data from the dealer weighout purchase reports, scallop survey data, and data from at-sea observers. Although there are some limitations to the data used in the analysis, these data are considered to be the best available.

In addition, the biological projections are based on the CASA model that is expected to generate more accurate results using a wide variety of data sources. This model uses information from all available sources, including surveys conducted outside of the NMFS federal scallop survey. Specifically, results from three other scallop surveys were integrated into the overall CASA model: optical survey by SMAST, dredge survey from VIMS, and optical survey from HABCAM. The CASA model was reviewed and approved for management use in the 2007 scallop assessment. This in addition to the Scallop Area Management Simulator (SAMS) model and Swept Area Seabed Impact (SASI) model used for habitat analysis are current, peer-reviewed modeling methods.

Lastly, the Council's SSC reviewed and approved the Acceptable Biological Catch (ABC) for this fishery for 2016 and 2017(default) based on updated analyses of biological uncertainty in the parameters used to assess the scallop resource. All of these models were recently updated for status determination and development of new reference points in July 2014 at the Stock Assessment Workshop in Woods Hole, MA (NEFSC, 2014). Therefore, this is considered the best available science to set MSY in order to prevent overfishing.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Under the Atlantic Sea Scallop FMP, the target fishing mortality rate and stock biomass are applied to the scallop resource from NC to the US/Canada boundary. This encompasses the entire range of scallop stocks under Federal jurisdiction. See Section 4.1 for a description of the scallop resource.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The management measures proposed in this action do not discriminate between residents of different states. Although it includes allocation measures, limited access vessels are relatively mobile and are expected to fish in various access areas. Limited access vessels are also permitted to trade access area trips with other vessels; if an area is far from their homeport and they do not want to fish in that area, they can trade for a trip closer to their homeport. In 2016 the access areas open to the LA fishery are all in the Mid-Atlantic, but the boundaries within the areas are flexible. A vessel does not have to fish exclusively in one area per trip. This will add flexibility for the fleet, and enables vessels to fish access area trips in a larger area overall.

General category vessels are not allocated individual access into scallop access areas; there is a fleet-wide allocation of trips for that entire segment of the fishery. Thus, general category vessels can decide to participate in any access area program or not. If a vessel is relatively small and it is not practical to fish farther offshore or travel great distances to fish in an access area, that vessel can fish its ITQ allocation in open areas. In 2016, the preferred alternative for LAGC access area trips includes access in both the MAAA as well as the northern part of NL. The Council recommended limited access in the northern part of NL for LAGC vessels to provide opportunities for more LAGC vessels throughout the region to fish in areas with higher catch rates (scallop access areas) compared to open areas, which are projected to have lower overall catch rates.

In general, LAGC vessels are typically smaller and less powerful than LA vessels; therefore, their ability to fish in areas farther from their homeport is more limited (See Section 5.4.3.12). In addition, LAGC vessels fish under a 600 pound possession limit and a fleet maximum on the number of access area trips; therefore, it may not be as practical for a LAGC vessel to travel greater distances for a relatively low possession limit and under a fleetwide allocation that may close. Overall, providing a relatively small amount access in NL-north provides some opportunity for more LAGC vessels to participate in the access area program, compared to other alternatives that only provide access in MAAA. If MAAA is the only access area open to LAGC vessels that would provide more opportunity for fewer LAGC vessels homeported near the MAAA, while the preferred alternative is expected to spread those benefits across more LAGC vessels and fishing communities.

The Council discussed that in this case it is important to provide some allocation level for access area in both the GB and MA regions because open area fishing has not been as productive as years past. Providing some access in both regions would be more fair among LAGC vessels so vessels from one region did not have excessive access to areas with better fishing conditions (access areas) compared to other vessels that would be restricted to fish in open areas only that are expected to have lower catch rates. The preferred alternative would allocate 19% of all the LAGC access area trips from the northern part of NL, and 81% of all access area trips from MAAA. This equates to about 300,000 pounds from NL-north and 1.2 million pounds from MAAA, out of the total LAGC allocation of 4.47 million pounds.

The total removal from NL-north in the preferred alternative is expected to promote conservation because it was set lower than other alternatives considered that would have removed more catch from NL-north. For example, Specification Alternative 5 considered a removal of about one million pounds and that showed long term negative impacts on the resource. The preferred alternative with a reduced level of harvest from NL-north is not expected to have negative impacts on future allocations from this area, especially if vessels do not highgrade, or increase mortality by targeting only large scallops (u10 in size). Lastly, the areas with the highest concentrations of small scallops observed on GB would still be closed to all scallop fishing, specifically the southern part of the NL access area and the EFH closed area in NL (**Figure 52**).

It should be noted that LAGC vessels from ports farther south would have the opportunity to fish in NL-north as well. While it may not be practical for them to do so for the same reasons vessels from the north may not travel to fish in Mid-Atlantic access areas, all LAGC vessels would have the opportunity to fish in NL-north until the area closes (after 485 trips are projected to be taken from the area). For example, if scallops are projected to be larger in NL-north compared to other areas, a LAGC vessel may decide to fish in that are to take advantage of the price premium for larger scallops.

Providing access to LAGC vessels in NL-north and not LA vessels could have differential impacts among these fisheries by allowing one segment of the fishery in an area before the other. However, the Council discussed that the large scale area rotation system primarily designed to manage the directed limited access fishery can in some cases disadvantage smaller vessels that fish in more localized areas. Therefore, in this particular case the Council supported allowing a relatively small amount of catch from NL-north for LAGC vessels only to acknowledge that different segments of the fishery have different needs and constraints. In addition, the Council developed a vision statement in the action that implemented the limited entry ITQ program for the LAGC fishery (Amendment 11). In summary, the vision statement describes an overall intent to maintain a diverse and flexible smaller scale scallop fishery that recognizes the important value the "dayboat" fishery has for small fishing communities including local scallop markets and consumers. The preferred alternative is expected to increase landings in ports closer to NL-north if LAGC vessels take advantage of that opportunity, compared to other alternatives that would only provide access area near Mid-Atlantic ports. Spreading some access farther north is expected to support the objective described in the vision statement from Amendment 11 to help maintain smaller scale scallops vessels and dayboat product in more small fishing communities.

In summary, there is flexibility within the area rotation system to further advance objectives described in Amendment 11 to support small fishing and the Council recommends that in this instance providing a relatively small amount of access in NL-north for LAGC vessels only is justified and helps achieve objectives of the FMP. The final preferred allocations are fair, promote conservation, and do not provide excessive share of a fishery privilege. In particular, the allocation in NL-north is a very small proportion of the total annual catch for the fishery, less than 1%; therefore, the overall impacts are considered minimal and there was stakeholder and public input on this specific recommendation.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The Preferred Allocation Alternative will promote efficiency in the utilization of fishery resources by allocating effort in areas with higher catch rates. In general area rotation promotes efficiency by increasing catch rates and reducing area swept, which reduce fishing time and increase profits for the fishery overall.

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The Proposed Action takes into account variations among and contingencies in fisheries, fishery resources, and catches. This action enhances the ability of the FMP to adapt to changing resource conditions. The access program is expected to allow the FMP to stabilize fishing effort in open areas, and potentially allowing the FMP greater flexibility to achieve optimum yield through rotational area management in the future. Natural resources vary and adjusting fishery specifications on a regular basis allows for relatively rapid changes to adjust to varying resource conditions. Variations in annual catch and allocations are still to be expected under area rotation, a system that is designed to optimize yield from variable recruitment patterns by area and year.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The Council considered the costs and benefits associated with the Proposed Action when developing this action. The proposed action does not introduce any new measures that duplicate measures already in place. Area rotation and DAS controls were implemented in 1994; the full area rotation program was implemented in June 2004. Both these types of measures are necessary components of the FMP to achieve the annual mortality targets and prevent the stock from becoming overfished. The increase in the average size of scallops landed, a primary objective of both the FMP and the proposed action, continues to be a major factor that minimizes harvesting costs. The management measures proposed in this action are not duplicative and were developed in close coordination with NMFS and the Mid-Atlantic Fishery Management Council.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished

stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

In the Amendment 10 FSEIS, the characteristics and participation of fishing communities involved in the scallop fishery were discussed in Section 7.1.1.3, and the impacts of rotation area management were discussed in Section 8.8. This document includes an update of fishery and community information in Section 4.4. The economic and social impacts, which affect fishing communities, are analyzed and discussed in Sections 5.4. The proposed action will not change these impacts anticipated under Amendment 10.

The proposed action, however, is not expected to jeopardize the sustained participation of fishing communities that have depended on the scallop resource. The area rotation and DAS adjustments are expected to continue to ensure a healthy resource that will be able to support historical levels of participation by fishing communities.

The aggregate economic impacts of the preferred alternative on net economic benefits are expected to be positive in the short-term compared both to the No Action and Status Quo levels. Under the preferred alternative scallop landings are estimated to be about 46.9M pounds, revenues about $538.7 million and total economic benefits to $526.9 million in 2016, higher than the actual levels in 2015. The total economic benefits of the preferred alternative would exceed the No Action levels by $160.8 million and the SQ levels by $19.4 million in the 2016 fishing year in terms of current (2015) prices, but would be lower than the benefits for other alternatives (**Table 78** in the economic section). However, present value of the cumulative revenues, producer surplus and total economic benefits would be negative under ALT3A over the long-term from 2016 to 2029 compared to the status quo values and would again be lower compared to the other alternatives except for the No Action scenario.

Overall, the net economic benefits of the preferred alternative (Alt3A) would be about $25.7 million lower than status quo benefits, and with highgrading, it would be about $28.1 million lower using a 7% discount rate. If the long-term benefits were discounted less using a 3% rate, than the long-term economic benefits would be even lower compared to status levels, by $35.6 million with no highgrading and by $38.4 million with highgrading (**Table 103**, Section 5.4.3.8). The economic impacts on the LAGC fishery are the same under all the specification alternatives considered since the IFQ allocation remains the same under all the alternatives, be 4,473,180 lb., which is about 16% higher than the allocation compared to No Action. As a result, the economic impacts of the preferred and other alternatives on the LAGC IFQ fishery is expected to be positive compared to both No Action and the Status Quo scenarios.

One aspect of the final specifications proposed that takes into account the importance of fishery resources to fishing communities is Alternative 2.2.3.2, access area allocations for LAGC vessels. The preferred alternative includes some access in NL-north for the LAGC fishery only. This was selected in part to provide some level of access in higher density areas for LAGC vessels that are not located near the MAAA. Catch rates have been lower in open areas in the last few years; therefore, providing some access in higher catch rate areas would have beneficial

impacts. About 40% of LAGC vessels are homeported in New England coastal communities and some of those vessels are not expected to travel to MAAA because it is not practical to do so. Providing some access in NL-north is expected to help sustain the LAGC fishery overall by providing some opportunity to more LAGC vessels to fish in productive areas compared to more opportunity for fewer vessels, if all the access area trips were allocated in MAAA.

In addition, the preferred alternative is expected to provide more dayboat product to scallop markets in a wider area, if more vessels chose to harvest and land scallops in that region compared to leasing quota to vessels from other areas. Scallop revenues from LAGC vessels from northern ports have declined in recent years, **Table 117**, and this measure could help address that trend. In addition, reducing competition and fishing effort in MAAA is expected to have low positive impacts on the total economic benefits from the scallop fishery as a whole. Since this option is not expected to have any significant effects on the scallop biomass over the long-term given that the highest concentrations of small scallops observed on Georges Bank in 2015 would still be closed to all scallop fishing, total economic benefits for the scallop fishery will be positive compared to Option 2 as well as compared to Option 1. (Section 3.12.3, **Table 117**). Therefore, the preferred alternative takes National Standard 8 into consideration because providing some access in higher catch rate areas for more LAGC vessels is expected to help sustain participation in more fishing communities and reduce overall economic and social hardships on more vessels.

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Bycatch in the scallop fishery has been minimized as a result of efficiencies under the overall area rotation system, which has increased scallop landings but reduced overall area swept. The FMP has also implemented several gear restrictions that have successfully reduced bycatch. These effects are discussed in detail in Section 6.1.9 of the Amendment 10 FSEIS, and in related sections of that document.

The Preferred Alternative for fishery specifications, Alternative 3a, does have a projected catch of SNE/MA yellowtail flounder that is potentially higher than the sub-ACL allocated to the scallop fishery in 2016 (**Table 122**). Therefore, there is a potential risk that the scallop fishery may exceed their sub-ACL and cause the total ACL to be exceeded (Section 5.5.2). It is noted that bycatch projections can vary greatly from actual catch, and have been overestimated in the past. Furthermore, there are several measures in place that may help reduce bycatch in the scallop fishery including a voluntary bycatch avoidance program, potential gear modifications, and elimination of the requirement to land legal sized yellowtail flounder. The total estimate of area swept from these specifications are lower than recent years; therefore, the preferred alternative should to the extent practicable, minimize bycatch.

A summary of the impacts of these measures are analyzed and described in Section 5.5. Bycatch of protected species is analyzed in Section 5.3.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Section 6.1.10 in the Amendment 10 FSEIS discusses the effect of current scallop management and of rotation area management on safety. This action does not propose any new measures that would change the findings in Amendment 10. Fishing is dangerous all times of the year, but some of the more restrictive alternatives would limit when vessels could fish in warmer months. The proposed measure that allocates some access in NL-north may help promote safety compared to other alternatives if LAGC located near NL decide not to steam to ports farther south to fish in access areas in the Mid-Atlantic.

6.1.2 Other Required Provisions of the M-S Act

Section 303 of the Magnuson-Stevens Fishery Conservation and Management Act contains 14 additional required provisions for FMPs, which are discussed below. Any FMP prepared by any Council, or by the Secretary, with respect to any fishery, shall:

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

Since the domestic scallop fishery is capable of catching and processing the allowable biological catch (ABC), there is no total allowable level of foreign fishing (TALFF) and foreign fishing on sea scallops is not permissible at this time.

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

The fishery and fishery participants are described in detail in Section 4.4 of Amendment 15 to the Scallop FMP. Section 4.4 in this document describes the scallop permits by category as well as the active scallop vessels by permit type that could be affected by this action. The number of trips and average scallops landed per category are also included in that section as well.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

The present and probable future condition of the resource and estimates of MSY and OY are given in Section 8.2.2.2 of Amendment 10 to the Scallop FMP.

The SSC reviewed the most recent work on assessing this resource and determined that acceptable biological catch be set at 37,852 mt in both 2016 and 2017 (default). Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan.

This level was recommended by the Science and Statistical Committee (SSC) and various sources of scientific uncertainty were considered when setting this value. ABC calculations were based on the overfishing definition approved in Amendment 15, spatially averaged $F = 0.48$. Fishery specifications are based on the ACT, or annual catch target. The control rule for target catches used in this FMP is that the spatially combined target fishing mortality must be no higher than that which gives a 25% probability of exceeding the ABC. This current estimate is a maximum of 0.34 for the ACT in the Scallop FMP. Target fishing mortalities can be set below these limits but not above them. Under these principles, the probable future condition of this fishery is sustainable.

Current domestic landings and processing capabilities are around 50-60 million lbs. Total landings have been above that level in some years since 2004, and are projected to be close to 47 million pounds for 2016 for the proposed action (Section 5.4.3). However, the actual landings could be higher or lower than this amount depending on the actual recruitment and scallop stock biomass in the open areas. In the past, actual landings of scallops exceeded the projected landings, but in 2014 and 2015 they are likely to be lower than projections.

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

The US fishery is expected to harvest 100% of OY and domestic processors are expected to be able to process 100% of OY.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, charter fishing, and fish processing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, economic information necessary to meet the requirement and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

The FMP and existing regulations specify the type of reports and information that scallop vessel owners and scallop dealers must submit to NMFS. These data include, but are not limited to, the weight of target species and incidental catch which is landed, characteristics about the vessel and gear in use, the number of crew aboard the vessel, when and where the vessel fished, and other pertinent information about a scallop fishing trip. Dealers must report the weight of species landed by the vessel, the date of landing, and the ex-vessel price for each species and/or size grade. Important information about vessel characteristics, ownership, and location of operation

is also required on scallop permit applications. Dealers are also surveyed for information about their processing capabilities.

All limited access scallop vessels and general category vessels are required to operate vessel monitoring system (VMS) equipment to record the location of the vessel for monitoring compliance with DAS regulations. An at-sea observer is also placed on scallop vessels at random to record more detailed information about the catch, including size frequency data, the quantity of discards by species, detailed gear data, and interactions with protected species.

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

The action proposed in this framework does not alter any adjustments made in the Scallop FMP that address opportunities for vessels that would otherwise be prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fisheries. No consultation with the Coast Guard is required relative to this issue.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

Essential fish habitat was defined in earlier scallop actions. This framework does not further address or modify those EFH definitions. There are no additional impacts to the physical environment or EFH expected from the action proposed in this framework.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

Data and research needs for the Atlantic sea scallop and its associated fisheries are described in Section 5.1.8 of Amendment 10 and Section 4.1 of Amendment 15. Other data already collected include fishery dependent data described in Section 6.2.4 of Amendment 10 and Section 4.4 of Amendment 15, and fishery-independent resource surveys that provide an index of scallop abundance and biomass.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on-- (A) participants in the fisheries and fishing communities affected by the plan or amendment; (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

and (C) the safety of human life at sea, including weather and to what extend such measures may affect the safety of participants in the fishery;

The impacts of the scallop management program in general have been analyzed in previous scallop actions (Amendment 10, Amendment 11, Amendment 15, Framework 16, and Frameworks 18 - 26). Any additional impacts from measures proposed in this action on fishery participants are summarized in Section 5.4. Safety in the scallop fishery was described in Section 8.1.5.6 of Amendment 10 and nothing proposed in this action will affect safety of human life at sea.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

Overfishing reference points describing targets and thresholds for biomass and fishing mortality were updated in the most recent stock assessment (2014) and are presented and explained in Section 4.1 of this document. Under this overfishing definition, the overfishing threshold will be based on the spatially averaged $F = 0.48$. Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. ABC for this fishery is set by applying 0.38, the fishing mortality rate that has a 25% chance of exceeding the OLF. Finally, the target fishery specifications are set below ABC at a fishing mortality target that has a 25% chance of exceeding the ABC (ACT = 0.34). The preferred alternative for this action has an overall spatially averaged fishing mortality target of 0.11.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

This action does not include changes to the current standardized bycatch reporting methodology (SBRM). This methodology is expected to assess the amount and type of bycatch in the scallop fishery and help identify ways the fishery can minimize bycatch and mortality of bycatch which cannot be avoided. The scallop fishery also has an industry funded observer set-aside program that provides additional funding (portion of total scallop catch set-aside) to put observers on scallop vessels.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

The Proposed Action does not address recreational fishing regulations. There are no substantial recreational or charter fishing sections in the scallop fishery. Any recreational scallop fishing is likely conducted by diving, and harvest is by hand, maximizing the survival of released scallops.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery, including its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

A detailed description of the scallop fishery is included in Section 7.1 of Amendment 10, Section 4.4 in Amendment 11, Section 4.4 of Amendment 15, and Section 4.4 of this action. These sections provide information relative to scallop vessels, processors, and dealers.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate, taking into consideration the economic impact of the harvest restrictions or recovery benefits on the fishery participants in each sector, any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery; and

This action proposes increased catch levels from FY2015, and closer to the average from more recent years (50 million pounds). The measures included in this action are expected to have positive economic impacts in the short- term (2016) compared both to the No Action alternative and Status Quo scenario. The proposed measures are expected to have positive economic impacts over the long-term (2016-2029) compared to the No Action, but the present value of the cumulative economic benefits would be lower than Status Quo levels. (Table 2 of Section 5.4.2). The proposed specification measures will affect the vessels with limited access permits participating in the sea scallop fishery in similar proportions since each vessel will receive the same number of open areas DAS and access area trip allocations according to their categories they belong, and the limited access general category IFQ vessels receive 5.5% of the total ACL. As a result, the proposed specification measures will have proportionally similar impacts on revenues and profits of each vessel compared to No Action levels.

The proposed action recommends allocating access area trips in a flexible manner, by allowing each LA vessel to decide which MA access area to fish in. This flexibility treats all vessels fairly. Section 5.4 is a detailed examination of the expected economic impacts of this action. Harvest from the Atlantic sea scallop fishery will continue to be reviewed, established, and analyzed through the biennial framework process. Recreational fishing for sea scallops is rare and does not affect the overall FMP or participants in the federal fishery.

(15) establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.

The proposed action includes catch limits for certain sectors of the scallop fishery, as well as effort controls for the rest of the fishery that is not under a direct TAC or quota. This action

covers 2016 and 2017 (default) only. Measures have been set well below the fishing mortality threshold of 0.48, so overfishing is not expected to occur.

Amendment 15 was approved in 2011, which brought the Scallop FMP in compliance with new annual catch limits required under the reauthorized Magnuson-Stevens Act of 2007. The ABC was set in this action under the same principles and the respective values are: 37,852 mt in 2016 and 2017 (default). Fishery allocations under the proposed action are set at $F = 0.11$ overall, and the annual catch from all areas associated with that fishing mortality level is projected to be around 47 million pounds in 2016 under the proposed action.

6.2 NEPA

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the M-S Act and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508). All of those requirements are addressed in this document, as referenced below.

6.2.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document as follows:

- The need for this action is described in Section 1.2;
- The alternatives that were considered are described in Section 2.0 (alternatives including the proposed action);
- The environmental impacts of the proposed action are described in Section 5.0;
- A determination of significance is in Section 6.2.2; and,
- The agencies and persons consulted on this action are listed in Section 6.2.3 and 6.2.4.

While not required for the preparation of an EA, this document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An executive summary can be found on page iii;
- A table of contents can be found on page ix;
- Background and purpose are described in Section 1.0;
- A summary of the document can be found in the executive summary, page iii;
- A brief description of the affected environment is in Section 4.0;
- Cumulative impacts of the proposed action are described in Section 5.6;
- A list of preparers is in Section 6.1.2.3.

6.2.2 Finding of No Significant Impact

National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. On July 22, 2005, NOAA published a Policy Directive with guidelines for the preparation of a Finding of No Significant Impact (FONSI). In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27 state that the significance of an

action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria, the recent Policy Directive from NOAA, and CEQ's context and intensity criteria. These include:

(1) Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

Response: No, the proposed action is not reasonably expected to jeopardize the sustainability of the sea scallop resource. Section 5.1 summarizes the overall impacts of this action on the target species. This action sets specifications for fishing years 2016 and 2017 (default) by modifying the rotational area management program implemented by Amendment 10. None of the modifications are expected to cause increases in fishing mortality above the overfishing threshold that would jeopardize the sustainability of the scallop resource. The action is designed to be consistent with the mortality targets adopted in Amendment 10 and the overall target has been set at a level less than ABC taking into account sources of biological and management uncertainty, as proposed in Amendment 15.

(2) Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?

Response: No, the proposed action is not reasonably expected to jeopardize the sustainability of any non-target species. A general description of the non-target species is summarized in Section 4.5, and a complete bycatch analysis of the scallop fishery was completed in Amendment 15. Section 5.5 summarizes the overall impacts of this action on non-target species. In general, this action does not increase overall fishing effort above levels assessed in Amendment 15, thus there is no indication that impacts on non-target species will be different.

Due to the distribution and behavior of yellowtail flounder, bycatch in the scallop fishery has been documented and is expected to continue under this action. The estimate of SNE/MA YT catch associated with the specifications proposed in this action are projected to be above the 2016 sub-ACL, and below the sub-ACLs for the other allocated stocks (GB YT and southern windowpane flounder). In general, selecting an alternative that allocates scallop fishing effort with a high probability of exceeding its bycatch sub-ACL for a stock runs a greater risk of exceeding the overall ACL. This could have negative impacts on the bycatch stock and the groundfish fishery overall. It is important to note that bycatch projections are complex; they are based on variety of assumptions and in the last few years final catch estimates have been below projected catches in most cases.

(3) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs?

Response: No, the proposed action is not reasonably expected to cause substantial damage to the ocean and coastal habitats and/or EFH. Section 5.2 summarizes the overall impacts of this action on habitat and EFH. Relative to the baseline habitat protections established under Amendment 10 to the Atlantic Sea Scallop FMP, those impacts are negligible, and relative to the No Action alternative, those impacts are marginally positive. Specifically, this action does not allow access

into the Habitat Closed Areas, and it maintains the requirement for scallop vessels to use 4-inch rings, which are believed to reduce impacts on benthic environments. Therefore, measures to further mitigate or minimize adverse effects on EFH are not necessary.

(4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

Response: No, the proposed action is not reasonably expected to have substantial adverse impacts on public health or safety. This action does not modify the primary measures used to manage the fishery and is not expected to change fishing behavior in any substantial way to adversely impact safety.

(5) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Response: No, the proposed action is not reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species. Section 4.3 describes the endangered or threatened species that are found in the affected area. Section 5.3 summarizes the impacts of the proposed action on endangered and threatened species. Overall, none of the proposed measures are expected to have a significant impact on these species as fishing behavior is not expected to change in any substantial way.

(6) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: The proposed action is not expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area. Section 4.2 describes the physical environment of the affected area including the benthic environment and biological parameters of the scallop resource. In general, this action proposes to maintain fishing mortality at levels similar to those established under Framework 26 (2015 fishing year); therefore, no additional impacts on biodiversity and ecosystem function are expected as a result of this action.

(7) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: No, this action does not propose any significant social or economic impacts interrelated with significant natural or physical environmental effects. Because the proposed action improves flexibility and performance of the rotational area management program, which has not had significant social or economic impacts interrelated with significant natural or physical environmental effects in the past, none are expected to result from the proposed action.

(8) Are the effects on the quality of the human environment likely to be highly controversial?

Response: No, the effects on the quality of the human environment are not likely to be highly controversial and the proposed specifications are based on the best available science. Section 5.0 assesses the expected impacts of the preferred alternative on the human environment, and Section 5.6 describes the potential cumulative impacts of this action on the human environment.

(9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Response: It is possible that historic or cultural resources such as shipwrecks could be present in the area where the scallop fishery is prosecuted. However, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is not likely that the proposed action would result in substantial impacts to unique areas.

(10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: No, the effects on the human environment are not likely to be highly uncertain or involve unique or unknown risks. The risks and impacts of this action and fishery on the human environment have been discussed and analyzed in previous actions. Scallop vessels have been managed under this FMP since 1982; therefore, the likely effects on the human environment are well understood.

(11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No, the proposed action is not related to other actions with individually insignificant but cumulatively significant impacts. Section 5.6 describes fishing and non-fishing past, present and reasonably foreseeable future actions that occurred or are expected to occur in the affected area. Some measures within the proposed action do result in cumulative impacts in some cases, but none of the impacts discussed exceed the threshold that would indicate a significant impact. In summary, the sea scallop resource, EFH, protected species, bycatch, and the human environment have been impacted by past and present actions in the area and are likely to continue to be impacted by these actions in the future. In general, the proposed action will modify the rotational area management program, which will have positive impacts on the long-term success of the program at preventing overfishing and achieving optimum yield on a continuing basis.

(12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: Although there are shipwrecks present in areas where fishing occurs, including some registered on the National Register of Historic Places, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is not likely that the proposed action would adversely affect the historic resources.

(13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: No, the proposed action is not reasonably expected to result in the introduction or spread of a nonindigenous species. The only nonindigenous species known to occur in any substantial amount within the fishery areas is the colonial sea squirt (*Didemnum sp*.). The tunicate occurs on pebble gravel habitat, and does not occur on moving sand. NMFS and the WHOI HabCam have surveyed the area and studies are underway to monitor *Didemnum*'s growth and effect on scallops and their habitat. At this time, there is no evidence that fishing

spreads this species more than it would spread naturally. Furthermore, the proposed action is not expected to spread the species more than regular fishing activity would; however, the spread of invasive tunicates and fishing gear needs to be monitored closely.

(14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about future consideration?
Response: No, the proposed action is not likely to establish a precedent for future action with significant effects, and it does not represent a decision in principle about future consideration. This action modifies an existing rotational area management program that is designed to be reviewed and adjusted every one to two years. Area rotation was established under Amendment 10, which was an EIS that assessed the long-term impacts of area rotation. While some argued during the development of this action that providing access area trips in NL-north for the LAGC fishery only would set a precedent for future specifications the Council does not agree. When specifications are developed the Council fully considers the details of all access area allocations in terms of whether the area should be open or closed, the level of access, and which permits should be granted access. This action proposes to allow a relatively small number of trips in part of an access area for one fishery only, but that does not mean that will become the default method the Council will use for future specifications, and the effects are not expected to be significant.

(15) Can the proposed action reasonably be expected to threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment?
Response: No, the proposed action is not reasonably expected to threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment. This action does not propose any changes that would provide incentive for environmental laws to be broken.

(16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?
Response: No, the proposed action is not reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. Both target and non-target species have been identified and assessed in this document (Section 5.1, 5.5, and 5.6). In general, this action will modify the rotational area management program, which will have positive impacts on both target and non-target species.

FONSI DETERMINATION:
In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Framework 27 to the Sea Scallop Fishery Management Plan, it is hereby determined that Framework 27 will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

_____ _____

Regional Administrator, Greater Atlantic Regional Fisheries Office, NMFS Date

6.2.3 List of Preparers; Point of Contact

Questions concerning this document may be addressed to:

Mr. Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 10950
(978) 465-0492

Additional copies of this EA can be requested via the above contact or through the Council's website at http://www.nefmc.org/scallops/index.html

Framework Adjustment 27 was prepared and evaluated in consultation with the National Marine Fisheries Service and the Mid-Atlantic Fishery Management Council. Members of the Scallop PDT prepared and reviewed portions of analyses and provided technical advice during the development of the Environmental Assessment. The list of Scallop PDT members is included in **Table 130**.

Table 130 – List of Scallop PDT members (2015)

Scallop Plan Development Team
Deirdre Boelke, PDT Chair, NEFMC
Lt. Josh Boyle, USCG
Matthew Camisa, MA DMF
Trisha Cheney, ME DMR
Dr. William DuPaul, VIMS
Travis Ford, GARFO, SFD
Emily Gilbert, GARFO, SFD
Benjamin Galuardi, GARFO APS
Dr. Demet Haksever, NEFMC
Dr. Dvora Hart, NEFSC, Population Dynamics
Katherine Richardson, GARFO, NEPA
Chad Keith, NEFSC, Observer Program
Emily Keiley, SMAST
Kevin Kelly, ME DMR
Min-Yang Lee, NEFSC, Social Science Branch
Danielle Palmer, GARFO, PRD
Dr. David Rudders, VIMS

In addition, other individuals contributed data and technical analyses for the document. Jui-Han Chen from NEFSC; and Dr. Jamie Cournane, Dr. Rachel Feeney, Dr. Fiona Hogan, Michelle Bachman, and Woneta Cloutier from NEFMC staff assisted with various sections of this document.

6.2.4 Agencies Consulted

The following agencies were consulted in the preparation of this document:

New England Fishery Management Council
Mid-Atlantic Fishery Management Council

National Marine Fisheries Service, NOAA, Department of Commerce
United States Coast Guard, Department of Homeland Security

6.2.5 Opportunity for Public Comment

The proposed action was developed during the period March 2015 through December 2015 and was discussed at the meetings listed in **Table 131**, below. Opportunities for public comment were provided at each of these meetings.

Table 131 – Summary of meetings with opportunity for public comment for Framework 27

Meeting	Location	Date
Scallop PDT	Mariners House, Boston, MA	3/3/2015
Scallop PDT Conference Call		3/12/2015
Scallop Advisory Panel	Four Points Sheraton, Boston, MA	3/31/2015
Scallop Committee	Four Points Sheraton, Boston, MA	4/1/2015
Joint Scallop PDT & Advisory Panel	Radisson Hotel, Warwick, RI	5/13/2015
Scallop Advisory Panel	Radisson Hotel, Warwick, RI	5/14/2016
Scallop Committee	Fairfield Inn, New Bedford, MA	5/28/2015
NEFMC Council Meeting	Hotel Viking, Newport, RI	6/18/2015
Scallop PDT	New England EPA, Boston, MA	7/15/2015
Scallop PDT	Coonamessett Inn, Falmouth, MA	8/25-26/2015
Scallop PDT Conference Call		9/9/2015
Scallop PDT Conference Call		9/11/2015
Scallop Advisory Panel	Hilton Garden Inn, Boston, MA	9/16/2015
Scallop Committee	Hilton Garden Inn, Boston, MA	9/17/2017
NEFMC Council Meeting	Radisson Hotel, Plymouth, MA	10/1/2015
Scallop PDT	Hilton Garden Inn, Boston, MA	10/7/2015
Scallop PDT Conference Call		10/14/2015
Scallop PDT Conference Call		10/28/2015
Scallop PDT Conference Call		11/9/2015
Scallop Advisory Panel	Radisson Hotel, Warwick, RI	11/18/2015
Scallop Committee	Radisson Hotel, Warwick, RI	11/19/2015
Scallop PDT Conference Call		12/1/2015
NEFMC Council Meeting	Holiday Inn by the Bay, Portland, ME	12/3/2015

6.3 MARINE MAMMAL PROTECTION ACT (MMPA)

Section 4.3 of this action contains a description of marine mammals potentially affected by the Scallop Fishery and Section 5.3 provides a summary of the impacts of the proposed action as analyzed in Framework 27. A final determination of consistency with the MMPA will be made by the agency when Framework 27 is implemented.

6.4 ENDANGERED SPECIES ACT (ESA)

Section 4.3 of this action contains a description of marine mammals potentially affected by the Scallop Fishery and Section 5.3 provides a summary of the impacts of the proposed action as analyzed in Framework 27. A final determination of consistency with the ESA will be made by the agency when Framework 27 is implemented.

6.5 ADMINISTRATIVE PROCEDURE ACT (APA)

Sections 551-553 of the Administrative Procedure Act established procedural requirements applicable to informal rulemaking by federal agencies. The purpose is to ensure public access to the federal rulemaking process, and to give public notice and opportunity for comment. The Council did not request relief from notice and comment rule making for this action, and the Council expects that NOAA Fisheries will publish proposed and final rule making for this action.

The Council has held sixteen meetings and seven conference calls open to the public on Framework 27 (**Table 131**). The Council initiated this action at the June 2015 Council meeting and approved final measures at the December 2015 meeting. After submission to NMFS, a proposed rule and notice of availability for Framework 27 under the M-S Act will be published to provide opportunity for public comment.

6.6 PAPERWORK REDUCTION ACT (PRA)

The purpose of the Paperwork Reduction Act is to minimize paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. It also ensures that the Government is not overly burdening the public with requests for information. Framework 27 includes revisions to the current PRA collection requirements associated with the GARFO Scallop Report Family of Forms (OMB Control No. 0648-0491). These revisions are due to the new pre-landing notification requirements for limited access vessels on access area trips, as well as limited access vessels that choose to DOF from Cape May, NJ. The amount that the proposed action would alter the burden hour estimates will be described and evaluated in an updated PRA analysis and public comments will be sought through Framework 27 proposed rulemaking.

6.7 COASTAL ZONE MANAGEMENT ACT (CZMA)

Section 307 of the Coastal Zone Management Act (CZMA) is known as the federal consistency provision. Federal Consistency review requires that "federal actions, occurring inside or outside of a state's coastal zone, that have a reasonable potential to affect the coastal resources or uses of that state's coastal zone, to be consistent with that state's enforceable coastal policies, to the maximum extent practicable." The Council previously made determinations that the FMP was consistent with each state's coastal zone management plan and policies, and each coastal state concurred in these consistency determinations (in Scallop FMP). Since the proposed action does not propose any substantive changes from the FMP, the Council has determined that this action is consistent with the coastal zone management plan and policies of the coastal states in this region. Once the Council has adopted final measures and submitted Framework 27 to NMFS, NMFS will request consistency reviews by CZM state agencies directly.

6.8 DATA QUALITY ACT

Utility of Information Product

The proposed document includes: A description of the management issues, a description of the alternatives considered, and the reasons for selecting the preferred management measures, to the extent that this has been done. These actions propose modifications to the existing FMP. These proposed modifications implement the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as well as all other existing applicable laws.

This proposed framework is being developed as part of a multi-stage process that involves review of the document by affected members of the public. The public has had the opportunity to review and comment on management measures during several meetings.

The Federal Register notice that announces the proposed rule and the implementing regulations will be made available in printed publication and on the website for the Greater Atlantic Regional Fisheries Office. The notice provides metric conversions for all measurements.

Integrity of Information Product

The information product meets the standards for integrity under the following types of documents:

Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Objectivity of Information Product

The category of information product that applies for this product is "Natural Resource Plans."

In preparing specifications documents, the Council must comply with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, the Administrative Procedure Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Data Quality Act, and Executive Orders 12630 (Property Rights), 12866 (Regulatory Planning), 13132 (Federalism), and 13158 (Marine Protected Areas).

This framework is being developed to comply with all applicable National Standards, including National Standard 2. National Standard 2 states that the FMP's conservation and management measures shall be based upon the best scientific information available. Despite current data limitations, the conservation and management measures proposed to be implemented under this framework are based upon the best scientific information available. This information includes complete NMFS dealer weighout data through 2014. Dealer data is used to characterize the economic impacts of the management proposals. The specialists who worked with these data are familiar with the most recent analytical techniques and with the available data and information relevant to the scallop fishery.

The policy choices (i.e., management measures) proposed to be implemented by this document are supported by the available information. The management measures contained in the framework document are designed to meet the conservation goals and objectives of the FMP.

The supporting materials and analyses used to develop the measures in the framework are contained in the document and to some degree in previous amendments and/or FMPs as specified in this document.

The review process for this framework involves the New England Fishery Management Council, the Northeast Fisheries Science Center, the Greater Atlantic Regional Fisheries Office, and NOAA Fisheries headquarters. The document was prepared by staff of the Council and Center with expertise in scallop resource issues, habitat issues, economics, and social sciences. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the specifications document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the specifications document and clearance of the rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

6.9 E.O. 13132 (FEDERALISM)

The E.O. on federalism establishes nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. Previous scallop actions have already described how the management plan is in compliance with this order. Furthermore, this action does not contain policies with Federalism implications, thus preparation of an assessment under E.O. 13132 is not warranted.

6.10 E.O. 12898 (ENVIRONMENTAL JUSTICE)

The alternatives in this framework are not expected to cause disproportionately high and adverse human health, environmental or economic effects on minority populations, low-income populations, or Native American peoples.

6.11 EXECUTIVE ORDER 12866 (REGULATORY IMPACT REVIEW)

6.11.1 Introduction

The Regulatory Impact Review (RIR) provides an assessment of the costs and benefits of preferred alternatives and other alternatives in accordance with the guidelines established by Executive Order 12866. The regulatory philosophy of Executive Order 12866 stresses that in deciding whether and how to regulate agencies should assess all costs and benefits of all regulatory alternatives and choose those approaches that maximize the net benefits to the society.

The RIR also serves as a basis for determining whether any proposed regulations are a "significant regulatory action" under the criteria provided in Executive Order 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 2180 (RFA).

The Framework 27 document contains all the elements of the RIR/RFA, and the relevant sections are identified by reference to the document. Economic impacts of this action are summarized in Section 5.4 of this document.

The purpose of and the need for action are described in Section 1.2. The description of the each selected alternative including the No Action alternative is provided in Section 2.0.

6.11.2 Economic Impacts

Section 5.4 evaluated economic impacts of Framework 27 proposed measures and alternatives considered by the Council. The combined impacts of the specification alternatives on scallop fishery, on consumers and total economic benefits to the nation are analyzed in Section 5.4.2 and subsections from 5.4.3.1 to 5.4.3.9. The economic impacts of the individual measures are discussed in Sections of 5.4.3.10 through 5.4.3.13 as indicated below. The values for economic impacts are presented in terms of 2015 dollars in Section 5.4, and for the determination of the significant impacts, cumulative present value of the net economic benefits to the nation are also estimated in terms of 2001 dollars consistent with the guidelines in Circular A-4 (2003) 19 . The results of the economic impacts in 2001 dollars were summarized in Table 132 Table 133 below.

- 5.4.1 Acceptable Biological Catch
- 5.4.2 Economic impacts of the Framework 27 specification alternatives
- 5.4.3.1 Proposed specification alternatives, No Action and Status quo
- 5.4.3.2 Summary of the economic impacts of the proposed specification alternatives
- 5.4.3.2.7 Impacts of the specification alternatives on the LAGC IFQ fishery
- 5.4.3.10 Allocation method for FT LA access area allocations
- 5.4.3.11 Allocation of LAGC IFQ trips in access areas
- 5.4.3.13 Additional measures to reduce the impacts on small scallops
- 5.4.3.14 Uncertainties and risks

Baseline for determination of significant impacts

Framework 27 is a one year action that will be implemented for the 2016 fishing year. It also includes default measures for 2017 in case the next Framework Action is delayed. The economic impacts of the proposed measures are estimated both relative to the "No Action" and relative to the Status Quo (SQ) levels in Section 5.4. The "No Action" alternative is used as a baseline for comparison of the biological and economic impacts of the proposed specification measures to the default measures in accordance with the 2007 NMFS guidelines, while the SQ scenario is used to evaluate whether the action will have a significant economic impact on the economy under the requirements of E.O.12866 for the reasons discussed in detail in Section 5.4 and summarized below.

- The definition of "No Action" follows a regulatory approach and refers to the default measures that are specified in the previous action, Framework 26, until the next Framework action is implemented in 2016. However, default measures are temporary in

[19] Page 32 of Circular A-4 (2003) states that: "In presenting the stream of benefits and costs, it is important to measure them in constant dollars to avoid the misleading effects of inflation in your estimates", and page 45 states that: "Please report all monetized effects in 2001 dollars. You should convert dollars expressed in different years to 2001 dollars using the GDP deflator".

nature as they are not intended to be in place for an entire fishing year without some sort of subsequent action. As a result, allocations under those measures have been determined at very precautionary low levels, corresponding to a fraction of allocations for the entire year, and intended to be replaced with subsequent measures based on updated survey information. Therefore, if economic benefits of the proposed alternatives were estimated using No Action as the baseline, the impacts on the economy would be considerably overstated in the short-term compared to the current levels.

- OMB recommends using more than one baseline when the choice of baseline will significantly affect estimated benefits and costs.[20] For this reason, the economic analyses provided for this framework includes a Status Quo scenario (SQ) to reflect the changes in landings and economic benefits as a result of projected changes in the scallop resource, but holding the allocations at the same levels as in the 2015 fishing year. For this reason, this baseline is more reflective of current fishing conditions since it includes the same level of access to the fishery as in FY2015.
- SQ as a baseline is also more consistent with the intent and the principles of E.O.12866 which requires that:" Each agency shall identify the problem that it intends to address …" The primary need of Framework 27 is "to achieve the objectives of the Atlantic Sea Scallop FMP to prevent overfishing and improve yield-per-recruit from the fishery" and the primary purpose is "to set annual specifications" to address this need. Therefore, the primary need of Framework 27 is much broader in scope than just replacing the temporary default measures (No Action) set in the previous framework to prevent issues related to the delays in implementation. For these reasons, the SQ baseline is what is used to evaluate whether the action will have a significant economic impact on the economy under the requirements of E.O.12866. Further discussion of the No Action and the Status Quo scenarios is provided in see Section 5.4.3.1 along with detailed comparisons in terms of both 2001 and 2015 dollars.

Summary of the aggregate economic impacts of the proposed measures

- The aggregate economic impacts of the preferred alternative and other alternatives, including the open area DAS and access area trip allocations and TAC and access area alternatives for the general category fishery, are expected to be positive in the short-term (2016) compared to both No Action and SQ scenarios. Alternative 4 (ETA Ext.) would result in largest total economic benefits ($30.5 million compared to SQ) followed by Alternative 5 (NLS Acc., $30 million) and Alternative 2 ($28.5 million), and Alternative 3 ($16.5 million) in 2016 fishing year (Table 1, in 2001 prices).
- The preferred alternative (ALT3A) will result in slightly lower revenues ($408.1 million) and total economic benefits ($399.2 million) in 2016 compared to other alternatives

[20] Circular A-4, September 17, 2003, http://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf

considered in this Framework (Table 132, in 2001 constant dollars). The total economic benefits of the preferred alternative will be higher than the SQ levels by $14.7 million in the 2016 fishing year. Although the difference from the No Action levels is much higher (about $121.8 million), as explained above, economic benefits compared to No Action do not realistically reflect the marginal impacts of the proposed measures on the economy. Again, this is because the allocations under No Action were intentionally set quite low and intended for a fraction of the year.

- Total economic benefits of all the alternatives, except for the preferred alternative (Alt.3A) and No Action, will exceed SQ benefits over the long-term as well. Total economic benefits are expected to be highest for Alternative 4 (ETA ext.) followed by Alternative 3 (CA2 ext.) and Alternative 5 (NLS Acc.) and will be least for Alternative 2 (Basic Run). However, the cumulative present value of the revenues for the preferred alternative will be lower than Status Quo values by $19.5 million ($27 million) using a discount rate of 7% (3%) over the long-term (2016 to 2029) in terms of 2001 constant prices (Table 133). Again, the SQ scenario provides a more realistic impacts estimate of long-term as well as short-term impacts on the economy compared to No Action alternative. The ranking of alternatives in terms of long-term economic benefits are similar whether the present value of total economic benefits are estimated using a 7% or a 3% discount rate.
- Biological projections for the preferred alternative and alternative 5 with NLS access were also run incorporating potential impacts of highgrading on the scallop biomass and yield. If highgrading occurs in the NLS area, total economic benefits for both the preferred alternative (Alt.3A) and Alternative 5 (NLS acc.) will be negative over the long-term net of status quo levels but will exceed the No Action levels. Further analysis on the sensitivity of results to highgrading is provided Section 5.4.3.8.
- There is also uncertainty regarding how high density of small scallops will affect mortality, scallop biomass and yield over the long-term as discussed in detail in Section 5.4.3.9. If density dependence affects mortality of scallops, absolute values of economic benefits for all alternatives will be 7% to 24% lower than estimated in Table 133 below. However, the ranking of alternatives compared to status quo or No Action benefits will not change since the benefits for all options would be reduced proportionally (Table 108and Table 109 in Section 5.4.3.9).

Table 132 - Economic Impacts for 2016: Estimated landings (Mill.lb.), revenues and economic benefits (in 2001 constant dollars, Mill. $)

Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5.NLS Acc.	SQ
FT LA Open area DAS	26	36.53	34.69	34.69	36.53	36.53	31
Total landings (Mill. lb.)	30.6	48.5	46.9	46.9	48.6	48.5	44.8
Difference from SQ	-14.2	3.7	2.1	2.1	3.8	3.7	
Difference from No Action		17.9	16.3	16.3	17.9	17.9	14.2
Total revenue (Mill. $)	287.3	420.8	409.5	408.1	422.4	422.0	393.4
Difference from No Action		133.5	122.1	120.7	135.0	134.7	106.1
Difference from SQ	-106.1	27.4	16.0	14.7	29.0	28.6	0.0
Producer Surplus (Mill. $)	264.3	383.6	373.3	371.6	385.5	385.1	359.0
Difference from No Action		119.3	109.0	107.3	121.2	120.8	94.8
Difference from SQ	-94.8	24.6	14.3	12.6	26.4	26.0	
Total Economic Benefits	277.3	413.0	400.9	399.2	415.0	414.5	384.5
Difference from No Action		135.6	123.6	121.8	137.6	137.1	107.1
Difference from SQ	-107.1	28.5	16.5	14.7	30.5	30.0	

Table 133 - Long-term Economic Impacts(2016-2029): Cumulative present value of revenues and total economic benefits *net of No Action and net of Status Quo* values (in 2001 constant dollars)

Values	1. No Action	2. Basic Run	3. CA2 ext.	Preferred Alt. 3A. CA2 ext.	4.ETA ext.	5A.NLS Acc.	5B. NLS high grading	SQ
	At 3% discount rate							
Total revenue (Mill. $)	7132.1	7208.5	7206.7	7179.1	7298.0	7210.2	7187.9	7198.1
Difference from No Action	0.0	76.4	74.6	47.0	165.9	78.1	55.8	66.0
Difference from SQ	-66.0	10.4	8.6	-19.0	99.9	12.1	-10.2	
Producer Surplus (Mill. $)	6495.3	6566.3	6563.4	6535.9	6649.8	6568.0	6545.5	6556.9
Difference from No Action	0.0	71.0	68.1	40.6	154.5	72.7	50.2	61.6
Difference from SQ	-61.6	9.4	6.5	-21.0	92.9	11.1	-11.4	
Total Economic Benefits (Mill. $)	7419.6	7478.0	7482.1	7445.2	7592.6	7480.1	7452.9	7472.1
Difference from No Action	0.0	58.4	62.5	25.6	173.0	60.5	33.3	52.6
Difference from SQ	-52.6	5.8	10.0	-27.0	120.5	8.0	-19.3	
	At 7% discount rate							
Total revenue (Mill. $)	5778.9	5860.0	5859.8	5835.8	5925.3	5861.8	5847.2	5848.1
Difference from No Action	0.0	81.1	80.9	56.9	146.4	82.9	68.3	69.2
Difference from SQ	-69.2	12.0	11.7	-12.2	77.2	13.7	-0.9	0.0
Producer Surplus (Mill. $)	5260.8	5335.7	5334.4	5310.2	5397.0	5337.5	5322.0	5324.9
Difference from No Action	0.0	75.0	73.6	49.5	136.2	76.8	61.2	64.2
Difference from SQ	-64.2	10.8	9.4	-14.7	72.0	12.6	-2.9	0.0
Total Economic Benefits (Mill. $)	6031.0	6096.0	6101.5	6068.6	6181.1	6098.2	6079.6	6088.1
Difference from No Action	0.0	64.9	70.4	37.6	150.0	67.1	48.5	57.0
Difference from SQ	-57.0	7.9	13.4	-19.5	93.0	10.1	-8.5	0.0

- The level of employment in the scallop fishery as measured by CREW*DAS will be higher under all alternatives compared to No Action and Status Quo levels for all

alternatives. Employment will be higher by about 6.1% in 2016 under the preferred alternative (ALT.3A) compared to other alternatives proportional to the increase in total DAS (Table 91). Employment under the preferred alternative and other alternatives will be similar over the long-term (2016-2029) and would be slightly higher compared to both No Action and Status Quo levels.

- Providing about the same level of access for LA and LAGC vessels in access areas in 2015 in terms of the total proportion of catch for the year (Option 3, Section 5.4.3.11) would have positive economic impacts compared No Action or compared to allocating 5.5% of the access area TAC to the LAGC IFQ fishery. The economic impacts on the LAGC-IFQ fishery will be positive due to lower costs and higher revenues associated with the flexibility provided to the fishermen to land a major proportion of their quota from access areas if those areas prove to be more productive as projected. Preferred area option (Option 3) would allocate about 19% of these trips (or 300,000 lb.) to the NLS North which is open to LAGC vessels only (5.4.3.12). This will have positive economic impacts on the IFQ vessels that are homeported in New England due to their proximity to the NLS access area compared to the Mid-Atlantic access areas. Allowing these vessels to take some of their trips in the NLS access area will help to increase incomes for the vessel owners and the crew by lowering trip costs compared to fishing in access areas of Mid-Atlantic with positive economic impacts on the scallop fishery as a whole.

- The cumulative impacts of the measures from Framework 27 proposed measures, and the past actions including Amendment 10, Amendment 11, Amendment 15, Framework 25 and Framework 24 to the scallop FMP, are estimated to be positive over the long-term. Adjustment of the open area DAS allocations, implementation of trip limits and allocations for the access areas and rotation area management had positive impacts on the scallop industry by increasing the revenues, producer and consumer surpluses and net benefits in the past. The Framework 27 measures are estimated to positive impacts on consumer, producer and total economic benefits in 2016 as well. Therefore, net cumulative impacts of the proposed measures and the past actions on revenues and economic benefits from the scallop fishery would be positive in 2016. The actions proposed by Framework 27 are expected to increase fleet revenues and profits compared to No Action, but would slightly reduce cumulative economic benefits compared to Status quo levels over the long-term from 2016-2029 by about $20 to $27 million. However, the long-term economic benefits of the past actions, including that of Framework 26, exceeded these relatively low negative long-term cumulative impacts from Framework 27. As a result, cumulative economic benefits over the long-term, which measure the sum of benefits from previous and preferred alternatives, are expected to be positive as well.

6.11.3 Enforcement Costs

The enforcement costs and benefits of the proposed options for Framework 27 are within the range of impacts addressed in Section 8.9 of Amendment 10 FSEIS and Section 5.4.22 and Section 5.6.3 of Amendment 11. The qualitative analysis included a discussion of the pros and cons of the proposed alternatives from an enforcement perspective. The proposed measures by Framework 27 are very similar to the existing measures in terms of the enforcement requirements, since they include the continuation of the area specific trip allocations, area closures, open area DAS allocations, measures for reducing bycatch, and the continuation of observer coverage program. The costs of implementing and enforcing the preferred alternative are not expected to compromise the effectiveness of implementation and enforcement of this action. Furthermore, there are several mechanisms and systems, such as VMS monitoring and data processing, already in place that will aid in monitoring and enforcement of this action. Therefore, the overall enforcement costs are not expected to change significantly from the levels necessary to enforce measures under the No Action regulations.

6.11.4 Determination of Significant Regulatory Action

Executive order 12866 defines a "significant regulatory action" as one that is likely to result in: a) an annual effect on the economy of $100 million or more, or one which adversely affects in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; b) a serious inconsistency or interference with an action taken or planned by another agency; c) a budgetary impact on entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; d) novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order.

Framework 27 is not expected to constitute a "significant regulatory action" based on the economic analyses provided in Section 5.4 and summarized above:

1. Framework 27 is a one year action that will be implemented for the 2016 fishing year. The short - term (2016) impacts of the preferred alternative on net economic benefits and on employment are expected to be positive compared to Status Quo (SQ) levels. The SQ scenario is used to evaluate whether the action will have significant economic impacts on the economy under the requirements of E.O.12866. The results show that the proposed measures are estimated to have positive impacts on the economy by about $14.7 million (in 2001 dollars), lower than $100 million threshold for significance, in 2016 fishing year (Table 132).
2. Over the long-term from 2016 to 2029 fishing years, the preferred alternative is estimated to have negative impacts on the total economic benefits and on the economy compared to Status Quo values by $27 million ($19.5 million) using a discount rate of 3% (7%) and in terms of 2001 constant prices (Table 133).

Thus, the preferred alternative will not have short or a long-term negative or positive annual impact on the economy by $100 million or more compared to Status Quo. The proposed measures will have positive impacts on employment in the scallop fishery. The proposed alternatives will not adversely affect in a material way the economy, productivity, competition,

public health or safety, jobs or state, local, or tribal governments or communities in the long run and will not raise novel legal and policy issues, other than those that were already addressed and analyzed in Amendment 10, Amendment 11 and Amendment 15. The preferred alternative also does not interfere with an action planned by another agency, since no other agency regulates the level of scallop harvest. It does not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients.

6.11.5 Initial Regulatory Flexibility Analysis

The purpose of the Regulatory Flexibility Analysis (RFA) is to reduce the impacts of burdensome regulations and record-keeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. Based on this information, the Regulatory Flexibility Analysis determines whether the preferred alternative would have a "significant economic impact on a substantial number of small entities."

An IRFA has been prepared, as required by section 603 of the Regulatory Flexibility Act (RFA). The IRFA consists of Framework 27 analyses, its draft IRFA, and the preamble to this action.

6.11.5.1 Statement of Objective and Need

This action proposes the management measures and specifications for the Atlantic sea scallop fishery for 2015, with 2016 default measures. A description of the action, why it is being considered, and the legal basis for this action are contained in Framework 26 and the preamble of this proposed rule and are not repeated here.

The proposed regulations would affect all vessels with LA and LAGC scallop permits. The Framework 27 document provides extensive information on the number and size of vessels and small businesses that would be affected by the proposed regulations, by port and state (See Section 4.4). There were 313 vessels that obtained full-time LA permits in 2015, including 250 dredge, 52 small-dredge, and 11 scallop trawl permits. In the same year, there were also 34 part-time LA permits in the sea scallop fishery. No vessels were issued occasional scallop permits. NMFS issued 220 LAGC IFQ permits in 2014 and 128 of these vessels actively fished for scallops that year (the remaining permits likely leased out scallop IFQ allocations with their permits in Confirmation of Permit History). The RFA defines a small business in shellfish fishery as a firm that is independently owned and operated and not dominant in its field of operation, with receipts of up to $5.5 M annually. Individually-permitted vessels may hold permits for several fisheries, harvesting species of fish that are regulated by several different fishery management plans, even beyond those impacted by the proposed action.

Furthermore, multiple permitted vessels and/or permits may be owned by entities affiliated by stock ownership, common management, identity of interest, contractual relationships, or economic dependency. For the purposes of this analysis, "ownership entities" are defined as those entities with common ownership as listed on the permit application. Only permits with identical ownership are categorized as an "ownership entity." For example, if five permits have the same seven persons listed as co-owners on their permit applications, those seven persons would form one "ownership entity," that holds those five permits. If two of those seven owners

also co-own additional vessels, that ownership arrangement would be considered a separate "ownership entity" for the purpose of this analysis.

On June 1 of each year, ownership entities are identified based on a list of all permits for the most recent complete calendar year. The current ownership dataset is based on the calendar year 2014 permits and contains average gross sales associated with those permits for calendar years 2012 through 2014. Matching the potentially impacted 2014 fishing year permits described above (LA and LAGC IFQ) to calendar year 2014 ownership data results in 166 distinct ownership entities for the LA fleet and 106 distinct ownership entities for the LAGC IFQ fleet. Of these, and based on the Small Business Administration (SBA) guidelines, 152 of the LA distinct ownership entities and all 102 of the LAGC IFQ entities are categorized as small. The remaining 14 of the LA and 4 of the LAGC IFQ entities are categorized as large entities, all of which are shellfish businesses.

Table 134. Number of vessels and business entities in the scallop limited access fishery (revenues include both from LA and LAGC trips for vessels that hold both permits and in 2015 constant prices).

Business	Values	2012	2013	2014
Large	Number of entities	20	13	14
	Number of permits	132	115	118
	Average scallop revenue per business entity	11,414,660	12,368,840	11,281,758
	Average revenue from other species per entity	887,756	1,200,076	1,138,721
	Average total revenue per business entity	12,302,592	13,569,350	12,420,478
	Total finfish revenue	17,755,125	15,600,994	15,942,091
	Total scallop revenue	228,293,203	160,794,919	157,944,606
	Total revenue	246,051,840	176,401,546	173,886,697
Small	Number of entities	144	152	152
	Number of permits	188	212	215
	Average scallop revenue per business entity	1,972,494	1,791,529	1,582,424
	Average revenue from other species per entity	51,461	51,884	51,006
	Average total revenue per business entity	2,023,955	1,843,414	1,633,430
	Total finfish revenue	7,410,430	7,886,388	7,752,955
	Total scallop revenue	284,039,099	272,312,477	240,528,399
	Total revenue	291,449,529	280,198,865	248,281,354
Number of entities		**164**	**165**	**166**
Number of permits		**320**	**327**	**333**
Average scallop revenue per business entity		**3,123,977**	**2,624,893**	**2,400,440**
Average revenue from other species per business entity		**153,449**	**142,348**	**142,741**
Average total revenue per business entity		**3,277,447**	**2,767,275**	**2,543,181**
Total finfish revenue		**25,165,555**	**23,487,382**	**23,695,046**
Total scallop revenue		**512,332,302**	**433,107,396**	**398,473,005**
Total revenue		**537,501,369**	**456,600,411**	**422,168,051**

Table 135. Number of vessels and business entities in the scallop IFQ fishery (Vessels with LA permits are excluded, revenues are in 2015 constant prices)

Business	Values	2012	2013	2014
Large	Number of entities	4	3	4
	Number of permits	14	13	19
	Average scallop revenue per business entity	9,054,899	9,266,527	7,684,894
	Average revenue from other species per entity	2,967,719	3,306,310	2,697,407
	Average total revenue per business entity	12,022,618	12,572,838	10,382,300
	Total finfish revenue	11,870,877	9,918,931	10,789,627
	Total scallop revenue	36,219,595	27,799,582	30,739,574
	Total revenue	48,090,472	37,718,513	41,529,201
Small	Number of entities	90	94	102
	Number of permits	100	105	112
	Average scallop revenue per business entity	577,740	559,337	545,773
	Average revenue from other species per entity	88,543	64,017	54,861
	Average total revenue per business entity	666,282	623,360	600,642
	Total finfish revenue	7,968,833	6,017,603	5,595,867
	Total scallop revenue	51,996,570	52,577,698	55,668,833
	Total revenue	59,965,403	58,595,876	61,265,518
Number of entities		**94**	**97**	**106**
Number of permits		**114**	**118**	**131**
Average scallop revenue per business entity		**938,470**	**828,632**	**815,174**
Average revenue from other species per business entity		**211,061**	**164,294**	**154,580**
Average total revenue per business entity		**1,149,531**	**992,932**	**969,762**
Total finfish revenue		**19,839,710**	**15,936,534**	**16,385,494**
Total scallop revenue		**88,216,165**	**80,377,280**	**86,408,407**
Total revenue		**108,055,875**	**96,314,389**	**102,794,719**

6.11.5.2 Description of Projected Reporting, Recordkeeping, and other Compliance Requirements of the Proposed Rule

This action contains no new collection-of-information, reporting, or recordkeeping requirements. It does not duplicate, overlap, or conflict with any other Federal law.

Federal Rules which may Duplicate, Overlap or Conflict with this Proposed Rule

The proposed regulations do not create overlapping regulations with any state regulations or other federal laws.

Description of Significant Alternatives to the Proposed Action

The preferred alternative (ALT3A) would allocate each FT limited access vessel 34.69 open area DAS and 51,000 pounds trip allocation to the Mid-Atlantic Access Areas. The LAGC IFQ sub-ACL is 4,473,180 pounds and NL-north will be open to LAGC vessels only. This alternative is expected to positively impact profitability of small entities regulated by this action in 2016. The estimated revenues and net revenue for scallop vessels and small business entities under all considered allocations alternatives, including the preferred alternative, are expected to be higher

than both the No Action alternative (i.e., 2016 default measures conservatively set through Framework 26) and status quo levels (i.e., assuming same level of access as 2015).

Framework 27 includes five allocation alternatives (ALT2, ALT3, ALT3A, ALT4, and ALT5) in addition to the "No Action" alternative (ALT1). Alternative 1 is the no action alternative which would allocate scallops based on the conservative default measures in Framework 26. Alternative 2 is to set target catches using the three principles developed as part of the "hybrid" overfishing definition approved in Amendment 15, and not include additional closures or modifications to boundaries of the overall area rotation program. Each LA FT vessel would be allocated 36.53 DAS for the open areas and 51,000 pounds to Mid Atlantic Access Areas and Closed Area 2 (one access area per trip; split trips for the fleet). .

Under Alternative 3 each FT vessel will be allocated 34.69 DAS and 51,000 pounds to Mid Atlantic Access Areas and Closed Area 2 (one access area per trip; split trips for the fleet). However, a new area south of CA2 would be closed to fishing to protect the small scallops. Preferred alternative 3A is similar to Alternative 3, except LA vessels would not be allocated trips in CA2. Instead, those trips would be shifted to MAAA with the inshore portion of ETA closed, CA1 and CA2 access areas closed, and NL-north open to LAGC vessels only. Similar to the other alternatives, each LA FT vessel would be allocated 51,000 pounds in MAAA. Alternative 4 would extend the in shore portion of ETA which was closed to fishing in 2015 to protect small scallops, but open area DAS and access area allocations would be similar to the basic run alternative. Allocations for Alternative 5 would be similar to the allocations for Alternative 2, however, in addition to the Mid-Atlantic access areas and Closed Area 2, this alternative would also provide a limited amount of effort to a portion of the NL access area expected to have lower densities of small scallops. Projections also include a Status Quo (SQ) as a baseline, assuming that the current level of allocations (in 2015) were continued in 2016, taking into account recent changes in the productivity and the spatial distribution of the scallop resource.

The preferred alternative would have would have about 43% higher benefits compared to the No Action and 4% higher revenues compared to the status quo levels, which would translate to higher profits. However, it would have lower ($2 million to $19 million) revenue compared to other alternatives in the 2016 fishing year (Table 136).

Table 136 - Estimated fleet revenue and revenue per limited access vessel in 2015 dollars

Alternatives	Total Revenue	Revenue per FT vessel	% Change from No Action	% Change from SQ
ALT1. No Action	379.3	1,081,573		-27%
ALT2. Basic Run	555.5	1,585,671	47%	7%
ALT3. CA2 ext.	540.5	1,542,766	43%	4%
ALT3A.CA2 ext.	538.7	1,537,502	42%	4%
ALT4.ETA ext.	557.6	1,591,545	47%	7%
ALT5.NLS Acc.	557.1	1,590,136	47%	7%
SQ	519.3	1,482,173	37%	0%

Under FY2016 default measures the LAGC IFQ allocation is million 3,745,615 lb. for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit. This allocation is equivalent to 5.5% of the ACL projected for FY2016 from FW26. LAGC IFQ vessels would also have access in the MA AA on April 1, 2016 under default measures, equal to 361,445 pounds or 602 trips (6.5% of the projected TAC for MA AA in 2016 under FW26).

Under all alternatives (ALT2, ALT3, ALT3A, ALT4 and ALT5), allocation for the LAGC IFQ fishery including the LA vessels with IFQ permits (4,473,180 lb.) will be about 16% higher than the allocation under the default measures for No Action. Allocation would also be about 50% higher compared to the status quo allocation for 2015 (2,971,800 lb.) As a result, the economic impacts of the preferred and other alternatives on the LAGC IFQ fishery is expected to be positive compared to both No Action and the Status Quo scenarios. Because the NGOM and incidental TACs are unchanged from previous years, those proposed allocations are not expected to directly impact small business entities.

As for LAGC IFQ access area allocations, the preferred alternative (Option 2) would provide proportional access for LA and LAGC IFQ for the access areas. The number of trips would be based on the total proportion of catch from AA compared to open areas (34% for 2,553 trips). Thus, it would allocate about 1.5 million pounds of the total LAGC allocation of 4.4 million pounds from access areas, while about 3 million pounds would still be left of the LAGC quota to be harvested in open areas. Preferred area option (option 3) would allocate about 19% of these trips (or 300,000 lb.) to the NLS North which is open to LAGC vessels only. Because of the proximity of the LAGC vessels which are smaller in size and homeported in Massachusetts to NLS access area, this option will reduce fishing costs and have positive impacts on their profits. Therefore, preferred alternative for LAGC access area allocations would have highest economic benefits compared to both No Action allocations and other options that allocate a smaller percentage of access area trips to the LAGC fishery.

Because the NGOM hard TAC and the target TAC for vessels with a LAGC Incidental permit is equivalent to the No Action and SQ values, economic impacts on those vessels will be neutral.

7.0 GLOSSARY

Area based management – in contrast to resource wide allocations of TAC or days, vessels would receive authorization to fish in specific areas, consistent with that area's status, productivity, and environmental characteristics. Area based management does not have to rotate closures to be effective.

Area rotation – a management system that selectively closes areas to fishing for short to medium durations to protect small scallops from capture by commercial fishing until the scallops reach a more optimum size. Closed areas would later re-open under special management rules until the resource in that area is similar to other open fishing areas. Area rotation is a special subset of area based management that relies on an area closure strategy to achieve the desired results when there are sufficient differences in the status of the management areas.

Biological Opinion – an ESA document prepared by either the NMFS or USFWS describing the impacts of a specific Federal action, including an FMP, on endangered or threatened species. The Biological Opinion concludes whether or not the NMFS/USFWS believe that the actions are likely to jeopardize the continued existence of any of the protected species, and provides recommendations for avoiding those adverse impacts.

Consumer surplus - The net benefit consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or landings go up.

Critical habitat – an area that has been specifically designated under the ESA as an area within the overall geographical region occupied by an endangered or threatened species on which are found the physical or biological features essential to conservation of the species.

Day-at-sea (DAS) – is each 24-hour period that a vessel is on a scallop trip (i.e. not declared out of the day-at-sea program) while seaward of the Colregs line.

Endangered species – a species that is in danger of extinction throughout all or a significant portion of its range.

Exploitable biomass - the total meat weight of scallops that are selected by fishing, accounting for gear and cull size, at the beginning of the fishing year[21].

Fixed costs - These costs include expenses that are generally independent of the level of fishing activity, i.e., DAS-used, such as insurance, license, half of repairs, office expenses, professional fees, dues, utility, interest, dock expenses, bank, rent, store, auto, travel, and employee benefits.

Incidental Take Statement – a section of a Biological Opinion that allows the take of a specific number of endangered species without threat of prosecution under the ESA. For the Scallop FMP, an incidental take statement has been issued for a limited number of sea turtles to be taken by permitted scallop vessels.

LPUE – Similar to catch per unit effort (CPUE), commonly used terminology in fisheries, LPUE in the Scallop FMP refers to the amount of landings per DAS a vessel achieves. This value is dependent on the scallop abundance and catch rate, but also depends on the shucking capacity of the crew and vessel, since most of the scallop catch must be shucked at sea. Since discard mortality for sea scallops is low, discards are not included as a measure of catch in the calculation of LPUE.

[21] The **average exploitable biomass** is different and is defined as the total meat weight of scallops that are selected by fishing averaged over the fishing year, accounting growth, natural mortality, fishing mortality, and gear and cull size.

Meat yield – the weight of a scallop meat in proportion to the total weight or size of a scallop. Scallops of similar size often have different meat yields due to energy going into spawning activity or due to the availability of food.

Net economic benefits - Total economic benefits measure the benefits both to the consumers and producers and are estimated by summing consumer and producer surpluses. Net economic benefits show, however, the change in total economic benefits net of no action.

Nominal versus real economic values - The nominal value of fishing revenues, prices, costs and economic benefits are simply their current monetary values unadjusted for inflation. Real values are obtained, however, by correcting the current values for the inflation.

Open area – a scallop fishing area that is open to regular scallop fishing rules. The target fishing mortality rate is the resource-wide target.

Operating expenses or variable costs - The operating costs measures the expenses that vary with the level of the fishing activity including food, ice, water, fuel, gear, supplies and half of the annual repairs.

Opportunity cost - The cost of forgoing the next best opportunity. For example, if a fisher's next best income alternative is to work in construction, the wage he would receive from construction work is his opportunity cost.

PDT – Scallop plan Development Team; a committee of experts that contributed to and developed the technical analysis and evaluation of alternatives.

Producer surplus -Producer surplus for a particular fishery shows the net benefits to harvesters, including vessel owners and the crew, and is measured by the difference between total revenue and operating costs.

Recruitment – a new year class of scallops measured by the resource survey. Scallop larvae are pelagic and settle to the bottom after 30-45 days after spawning. The resource survey, using a lined dredge, is able to capture scallops between 20 – 40 mm, but more reliably at between 40 and 60 mm. Recruitment in this document refers to a new year class that is observable in the survey, at around two years after the eggs had been fertilized and spawned.

SAFE Report – A Stock Assessment and Fishery Evaluation Report, required by the Sustainable Fisheries Act. This report describes the present condition of the resource and managed fisheries, and in New England it is prepared by the Council through its Plan Development Teams (PDT) or Monitoring Committees (MC). The Scallop PDT is the MC for the Atlantic Sea Scallop FMP and prepares this report.

Shucking – a manual process of cutting scallop meats from the shell and viscera.

TAC – Total allowable catch is an estimate of the weight of scallops that may be captured by fishing at a target fishing mortality rate. The TAC could apply to specific areas under area based management rules.

Take – a term under the MMPA and ESA that means to harass, harm , pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct with respect to either a marine mammal or endangered species.

Ten-minute square – an approximate rectangle with the dimensions of 10-minutes of longitude and 10-minutes of latitude.

Threatened species – any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

8.0 LITURATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). 2007. Special Report to the Atlantic Sturgeon Management Board: Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic. August 2007. 95 pp.

Atlantic Sturgeon Status Review Team (ASSRT). 2007. Status review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 pp.

Bain, M. B., N . Haley, D. Peterson, J. R. Waldman, and K. Arend. 2000. Harvest and habitats of Atlantic sturgeon *Acipenser oxyrinchus* Mitchill, 1815, in the Hudson River Estuary: Lessonsfor Sturgeon Conservation. Instituto Espanol de Oceanografia. Boletin 16: 43-53.

Baum, E.T. 1997. Maine Atlantic Salmon - A National Treasure. Atlantic Salmon Unlimited, Hermon, Maine.

Braun, J., and S.P. Epperly. 1996. Aerial surveys for sea turtles in southern Georgia waters, June 1991. Gulf of Mexico Science 1996(1):39-44.

Braun-McNeill, J., and S.P. Epperly. 2004. Spatial and temporal distribution of sea turtles in the western North Atlantic and the U.S. Gulf of Mexico from Marine Recreational Fishery Statistics Survey (MRFSS). Marine Fisheries Review 64(4):50-56.

Braun-McNeill, J., C.R. Sasso, S.P.Epperly, C. Rivero. 2008. Feasibility of using sea surface temperature imagery to mitigate cheloniid sea turtle–fishery interactions off the coast of northeastern USA. Endangered Species Research: Vol. 5: 257–266, 2008.

Brown, M.B., O.C. Nichols, M.K. Marx, and J.N. Ciano. 2002. Surveillance of North Atlantic right whales in Cape Cod Bay and adjacent waters. Final report to the Division of Marine

Fisheries, Commonwealth of Massachusetts. September 2002. 29 pp.

Burdge, R. J. (2004). *The Concepts, Process, and Methods of Social Impact Assessment.* Middleton, WI. Social Ecology Press.

Burdge, R. J., & Vanclay, F. (1995). Social impact assessment. *Environmental and social impact assessment*, 31–66.

Cetacean and Turtle Assessment Program (CeTAP). 1982. Final report or the cetacean and turtle assessment program, University of Rhode Island, to Bureau of Land Management, U.S. Department of the Interior. Ref. No. AA551-CT8-48. 568 pp.

Clapham, P.J., L.S. Baraff, C.A. Carlson, M.A. Christian, D.K. Mattila, C.A. Mayo, M.A. Murphy and S. Pittman. 1993. Seasonal occurrence and annual return of humpback whales, *Megaptera novaeangliae*, in the southern Gulf of Maine. Can. J. Zool. 71: 440-443.

Cole, T. V.N., P. Hamilton, A. G. Henry, P. Duley, R. M. Pace III, B. N. White, T. Frasier. 2013. Evidence of a North Atlantic right whale *Eubalaena glacialis* mating ground. Endang Species Res 21: 55–64.

Collins, M. R. and T. I. J. Smith. 1997. Distribution of shortnose and Atlantic sturgeons in South Carolina. North American Journal of Fisheries Management. 17: 995-1000.

Conant, T.A., P.H. Dutton, T. Eguchi, S.P. Epperly, C.C. Fahy, M.H. Godfrey, S.L. MacPherson, E.E. Possardt, B.A. Schroeder, J.A. Seminoff, M.L. Snover, C.M. Upite, and B.E. Witherington. 2009. Loggerhead sea turtle (*Caretta caretta*) 2009 status review under the U.S. Endangered Species Act. Report of the Loggerhead Biological Review Team to the National Marine Fisheries Service, August 2009. 222 pp.

Coonamessett Farm Foundation et al, 2011 RSA Final Report, *Optimizing the Georges Bank Scallop Fishery by Maximizing Meat Yield and Minimizing Bycatch,* August 2012

Dadswell, M. 2006. A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. Fisheries 31: 218-229.

Dadswell, M. J., B. D. Taubert, T. S. Squiers, D. Marchette, and J. Buckley. 1984. Synopsis of Biological Data on Shortnose Sturgeon, Acipenser brevirostrum, LeSuer 1818.

Damon-Randall, K., M. Colligan, and J. Crocker. 2013. Composition of Atlantic Sturgeon in Rivers, Estuaries, and Marine Waters. National Marine Fisheries Service, NERO, Unpublished Report. February 2013. 33 pp.

Dodge, K.L., B. Galuardi, T. J. Miller, and M. E. Lutcavage. 2014. Leatherback Turtle Movements, Dive Behavior, and Habitat Characteristics in Ecoregions of the Northwest Atlantic Ocean. PLOS ONE 9 (3) e91726: 1-17.

Dovel, W.L. and T.J. Berggren. 1983. Atlantic sturgeon of the Hudson River Estuary, New York. New York Fish and Game Journal 30: 140-172.

Dunton, K.J., A. Jordaan, K.A. McKown, D.O. Conover, and M.J. Frisk. 2010. Abundance and distribution of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) within the Northwest Atlantic Ocean, determined from five fishery-independent surveys. Fishery Bulletin 108:450-465.

DuPaul, W., D. Rudders, R. Smolowitz. 2004. Industry trials of a modified sea scallop dredge to minimize the catch of sea turtles. Scallop RSA Final Report Grant No. NA03NMF4530344. VIMS Marine Resource Report No. 2004-12.

Epperly, S.P., J. Braun, and A.J. Chester. 1995a. Aerial surveys for sea turtles in North Carolina inshore waters. Fishery Bulletin 93:254-261.

Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J.V. Merriner, and P.A. Tester. 1995b. Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery. Bulletin of Marine Science 56(2):547-568.

Epperly, S.P., J. Braun, and A. Veishlow. 1995c. Sea turtles in North Carolina waters. Conservation Biology 9(2):384-394.

Epperly, S., L. Avens, L. Garrison, T. Henwood, W. Hoggard, J. Mitchell, J. Nance, J. Poffenberger, C. Sasso, E. Scott-Denton, and C. Yeung. 2002. Analysis of sea turtle bycatch in the commercial shrimp fisheries of southeast U.S. waters and the Gulf of Mexico. NOAA Technical Memorandum NMFS-SEFSC-490:1-88.

Erickson, D. L., A. Kahnle, M. J. Millard, E. A. Mora, M. Bryja, A. Higgs, J. Mohler, M. DuFour, G. Kenney, J. Sweka, and E. K. Pikitch. 2011. Use of pop-up satellite archival tags to identify oceanic-migratory patterns for adult Atlantic Sturgeon, *Acipenser oxyrinchus oxyrinchus* Mitchell, 1815. J. Appl. Ichthyol. 27: 356–365.

Fay, C., M. Bartron, S. Craig, A. Hecht, J. Pruden, R. Saunders, T. Sheehan, and J. Trial. 2006. Status Review for Anadromous Atlantic Salmon (Salmo salar) in the United States. Report to the National Marine Fisheries Service and U.S. Fish and Wildlife Service. 294 pages.

Flinn, R.D., A.W. Trites and E.J. Gregr. 2002. Diets of fin, sei, and sperm whales in British Columbia: An analysis of commercial whaling records, 1963-1967. Mar. Mamm Sci. 18(3): 663-679.

Griffin, D.B., S. R. Murphy, M. G. Frick, A. C. Broderick, J. W. Coker, M. S. Coyne, M. G. Dodd, M. H. Godfrey, B. J. Godley, L. A. Hawkes, T. M. Murphy, K. L. Williams, and M. J. Witt. 2013. Foraging habitats and migration corridors utilized by a recovering subpopulation of adult female loggerhead sea turtles: implications for conservation. Mar. Biol. 160: 3071–3086.

Hart, D.R. and A.S. Chute. 2004. Essential fish habitat source document: Sea scallop, Placopecten magellanicus, life history and habitat characteristics, 2nd ed. NOAA Technical Memorandum NMFS NE-189.

Haas, H.L., E. LaCasella, R. LeRoux, H. Milliken, and B. Hayward. 2008. Characteristics of sea turtles incidentally captured in the U.S. Atlantic sea scallop dredge fishery. Fisheries Research 93:289-295.

Haas, H.L. 2010. Using observed interactions between sea turtles and commercial bottom-trawling vessels to evaluate the conservation value of trawl gear modifications. Mar. Coast. Fish. 2, 263-276.

Hawkes, L.A., M.J. Witt, A.C. Broderick, J.W. Coker, M.S. Coyne, M. Dodd, M.G. Frick, M.H. Godfrey, D.B. Griffin, S.R. Murphy, T.M. Murphy, K.L. Williams, and B.J. Godley. 2011. Home on the range: spatial ecology of loggerhead turtles in Atlantic waters of the USA. Diversity and Distributions 17:624–640.

Henwood, T.A., and W. Stuntz. 1987. Analysis of sea turtle captures and mortalities during commercial shrimp trawling. Fishery Bulletin 85(4):813-817.

Hirth, H.F. 1997. Synopsis of the biological data of the green turtle, Chelonia mydas (Linnaeus 1758). USFWS Biological Report 97(1):1-120.

Hyvarinen, P., P. Suuronen and T. Laaksonen. 2006. Short-term movement of wild and reared Atlantic salmon smolts in brackish water estuary – preliminary study. Fish. Mgmt. Eco. 13(6): 399 -401.

Interorganizational Committee on Principles and Guidelines for Social Impact Assessment. (1994). Guidelines and Principles for Social Impact Assessment. *Impact Assessment*. 12(2), 107-152.

Interorganizational Committee on Principles and Guidelines for Social Impact Assessment. (2003). Principles and guidelines for SIA in the USA. *Impact Assess. Proj. Appraisal* 21(3):231–250.

James, M.C., R.A. Myers, and C.A. Ottenmeyer. 2005. Behaviour of leatherback sea turtles, *Dermochelys coriacea*, during the migratory cycle. Proc. R. Soc. B, 272: 1547-1555.

James, M.C., S.A. Sherrill-Mix, K. Martin, and R. A. Myers. 2006. Canadian waters provide critical foraging habitat for leatherback sea turtles. Biological Conservation 133: 347-357.

Kenney, R.D., M.A.M. Hyman, R.E. Owen, G.P. Scott and H.E. Winn. 1986. Estimation of prey densities required by western North Atlantic right whales. Mar. Mamm. Sci. 2: 1–13.

Kenney, R.D., H.E. Winn and M.C. Macaulay 1995. Cetaceans in the Great South Channel, 1979-1989: right whale (*Eubalaena glacialis*). Cont. Shelf Res. 15: 385–414.

Khan, C., T.V.N. Cole, P. Duley, A. Glass, M. Niemeyer, and C. Christman. 2009. North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) 2008 Results Summary. NEFSC Reference Document 09-05. 7 pp.

Khan, C., T. Cole, P. Duley, A. Glass, and J. Gatzke. 2010. North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) 2009 Results Summary. NEFSC Reference Document 10-07. 7 pp.

Khan, C., T. Cole, P. Duley, A. Glass, and J. Gatzke. 2011. North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) 2010 Results Summary. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 11-05. 6 pp.

Khan C., T. Cole, P. Duley, A. Glass, and J. Gatzke, J. Corkeron. 2012. North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) 2011 Results Summary. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-09; 6 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/

Kynard, B., M. Horgan, M. Kieffer, and D. Seibel. 2000. Habitat used by shortnose sturgeon in two Massachusetts rivers, with notes on estuarine Atlantic sturgeon: A hierarchical approach. Transactions of the American Fisheries Society 129: 487-503.

Lacroix, G.L. and McCurdy, P. 1996. Migratory behavior of post-smolt Atlantic salmon during initial stages of seaward migration. J. Fish Biol. 49, 1086-1101.

Lacroix, G. L, McCurdy, P., Knox, D. 2004. Migration of Atlantic salmon post smolts in relation to habitat use in a coastal system. Trans. Am. Fish. Soc. 133(6): pp. 1455-1471.

Lacroix, G.L. and D. Knox. 2005. Distribution of Atlantic salmon (*Salmo salar*) postsmolts of different origins in the Bay of Fundy and Gulf of Maine and evaluation of factors affecting migration, growth, and survival. Can. J. Fish. Aquat. Sci. 62: 1363–1376.

Laney, R.W., J.E. Hightower, B.R. Versak, M.F. Mangold, W.W. Cole Jr., and S.E. Winslow 2007. Distribution, habitat use, and size of Atlantic sturgeon captured during cooperative winter tagging cruises, 1988–2006. Pages 167-182. In: J. Munro, D. Hatin, J. E. Hightower, K. McKown, K. J. Sulak, A. W. Kahnle, and F. Caron, (editors), Anadromous sturgeons: Habitats, threats, and management. Am. Fish. Soc. Symp. 56, Bethesda, MD.

Lutcavage, M.E., and P.L. Lutz. 1997. Diving physiology. Pages 277-296 in P.L. Lutz and J.A. Musick, eds. The Biology of Sea Turtles. Boca Raton, Florida: CRC Press.

Mayo, C.A. and M.K. Marx. 1990. Surface foraging behaviour of the North Atlantic right whale, *Eubalaena glacialis*, and associated zooplankton characteristics. Can. J. Zool. 68: 2214–2220.

Miller, T. and G. Shepard. 2011. Summary of Discard Estimates for Atlantic Sturgeon. Northeast

Fisheries Science Center, Population Dynamics Branch, August 2011.

Mitchell, G.H., R.D. Kenney, A.M. Farak, and R.J. Campbell. 2003. Evaluation of occurrence of endangered and threatened marine species in naval ship trial areas and transit lanes in the Gulf of Maine and offshore of Georges Bank. NUWC-NPT Technical Memo 02-121A. March 2003. 113 pp.

Morreale, S.J. and E.A. Standora. 2005. Western North Atlantic waters: Crucial developmental habitat for Kemp's ridley and loggerhead sea turtles. Chel. Conserv. Biol. 4(4):872-882.

Murray, K.T., 2008. Estimated Average Annual Bycatch of Loggerhead Sea Turtles (*Caretta caretta*) in US Mid-Atlantic Bottom Otter Trawl Gear, 1996–2004, second ed. US Dep. Commer., Northeast Fish Sci. Cent. Ref. Doc. 08-20, p. 32. <http://www.nefsc.noaa.gov/publications/crd/crd0820>.

Murray, K.T. 2011. Interactions between sea turtles and dredge gear in the U.S. sea scallop (*Placopecten magellanicus*) fishery, 2001-2008. Fisheries Research 107:137-146.

Murray, K.T. 2013. Estimated loggerhead and unidentified hard-shelled turtle interactions in mid-Atlantic gillnet gear, 2007-2011. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-NM-225. 20 pp. Available at http://www.nefsc.noaa.gov/publications/tm/.

Murray, K.T. and C.D.Orphanides. 2013. Estimating the risk of loggerhead turtle *Caretta caretta* bycatch in the U.S. mid-Atlantic using fishery-independent and –dependent data. Marine Ecology Progress Series. 477:259-270.

National Marine Fisheries Service (NMFS). 1991. Final recovery plan for the humpback whale (*Megaptera novaeangliae*). Prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, MD. 105 pp.

NMFS (National Marine Fisheries Service). 2003. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. February 24, 2003.

NMFS (National Marine Fisheries Service). 2004a. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. February 23, 2004.

NMFS (National Marine Fisheries Service). 2004b. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. December 15, 2004

National Marine Fisheries Service (NMFS). 2005. Revision- recovery plan for the North Atlantic right whale (*Eubalaena glacialis*). Prepared by the Office of Protected Resources National Marine Fisheries Service, Silver Spring, MD. 137 pp.

NMFS (National Marine Fisheries Service). 2006. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. September 18, 2006.

NMFS (National Marine Fisheries Service). 2008. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. March 14, 2008.

National Marine Fisheries Service (NMFS). 2010a. Biological Assessment of Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Status Review Team for the National Marine Fisheries Service, Gloucester MA. 417pp.

National Marine Fisheries Service (NMFS). 2010b. Final recovery plan for the fin whale (*Balaenoptera physalus*). Prepared by the Office of Protected Resources National Marine Fisheries Service, Silver Spring, MD. 121 pp.

National Marine Fisheries Service (NMFS). 2011. Final recovery plan for the sei whale (*Balaenoptera borealis*). Prepared by the Office of Protected Resources National Marine Fisheries Service, Silver Spring, MD. 108 pp.

National Marine Fisheries Service (NMFS). 2012a. North Atlantic Right Whale (*Eubalaena glacialis*) five year review: summary and evaluation. NOAA Fisheries Service, Northeast Regional Office, Gloucester, MA. 36pp.

NMFS (National Marine Fisheries Service). 2012b. Reinitiation of Endangered Species Act Section 7 Consultation for the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. July 12, 2012.

National Marine Fisheries Service (NMFS). 2012b. Endangered species Act section 7 consultation on the Atlantic Sea scallop Fishery Management Plan. http://www.greateratlantic.fisheries.noaa.gov/prot_res/section7/NMFS-signedBOs/2012ScallopBiOp071212.pdf

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1991. Recovery plan for U.S. population of Atlantic green turtle (*Chelonia mydas*). National Marine Fisheries Service, Washington, D.C. 58 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1992. Recovery plan for leatherback turtles (*Dermochelys coriacea*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 65 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1993. Recovery plan for the Hawksbill turtle (*Eretmochelys imbricate*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 58 pp.

National Oceanic and Atmospheric Administration (NOAA). 2009. Small Entity Compliance Guide. June 24, 2009.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 1995. Status reviews for sea turtles listed under the Endangered Species Act of 1973. Silver Spring, Maryland: National Marine Fisheries Service. 139 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 1998a. Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle (Dermochelys coriacea). Silver Spring, Maryland: National Marine Fisheries Service. 65 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 1998b. Recovery Plan for U.S. Pacific Populations of the Green Turtle (Chelonia mydas). Silver Spring, Maryland: National Marine Fisheries Service. 84 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2005. Recovery plan for the Gulf of Maine distinct population segment of the Atlantic salmon (Salmo salar). National Marine Fisheries Service, Silver Spring, MD.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2007a. Kemp's ridley sea turtle *(Lepidochelys kempii*) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 50 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2007b. Green sea turtle (*Chelonia mydas*) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 102 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2008. Recovery plan for the Northwest Atlantic population of the loggerhead turtle (Caretta caretta), Second revision. Washington, D.C.: National Marine Fisheries Service. 325 pp.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2013. Leatherback sea turtle (Dermochelys coriacea) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 91 pp.

National Marine Fisheries Service, U.S. Fish and Wildlife Service, and SEMARNAT. 2011. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. National Marine Fisheries Service. Silver Spring, MD. 156 pp. + appendices.

National Oceanic and Atmospheric Administration (NOAA). 2008. High numbers of right whales seen in Gulf of Maine: NOAA researchers identify wintering ground and potential breeding ground. NOAA press release. December 31, 2008.

NMFS, June 2007. Northeast Region Standardized Bycatch Reporting Methodology (SBRM), Amendment 12 to the Scallop FMP. Approximately 300 pages and 8 appendices. Available at http://www.nefmc.org/scallops/index.html

NMFS, National Marine Fisheries Service (2007). Appendix 2-g: Guidelines for the Assessment of the Social Impact of Fishery Management Actions. Washington DC: NMFS.

NMFS, List of Fisheries for 2013. 78 FR 53336. August 29, 2013 http://www.gpo.gov/fdsys/pkg/FR-2013-08-29/pdf/2013-21054.pdf

NEFMC. 2003. Final Amendment 10 to the Atlantic Sea Scallop Fishery Management Plan with a Supplemental Environmental Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 1100 pages plus 9 appendices. Available at http://www.nefmc.org/scallops/planamen/a10/final_amend_10.htm.

NEFMC. 2004. Final Amendment 13 to the Northeast Multispecies Fishery Management Plan with a Supplemental Environmental Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Analysis. Newburyport, MA.

NEFMC. 2010. Final Amendment 15 to the Atlantic Sea Scallop Fishery Management Plan with Environmental Assessment, Regulatory Impact Review, Environmental Impact Statement, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 350 pages plus 5 appendices. Available at http://www.nefmc.org/scallops/index.html

NEFMC (New England Fishery Management Council). 2011a. Final Framework 22 to the Atlantic Sea Scallop FMP including an Environmental Assessment, an Initial Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE) Report. New England Fishery Management Council. March 2011.

NEFMC (New England Fishery Management Council). 2011b. Final Framework 23 to the Scallop Fishery Management Plan, including a Draft Environmental Assessment (EA). New England Fishery Management Council. October 2011.

NEFMC. 2013. Final Framework 48 to the Multispecies Fishery Management Plan with Environmental Assessment, Regulatory Impact Review, Environmental Impact Statement, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 675 pages plus 4 appendices. Available at http://www.nefmc.org/groundfish/index.html

NEFMC. 2013. Final Framework 24 to the Atlantic Sea Scallop Fishery Management Plan with Environmental Assessment, Regulatory Impact Review, Environmental Impact Statement, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 350 pages plus 4 appendices. Available at http://www.nefmc.org/scallops/index.html

NEFMC. 2014. Final Framework 51 to the Multispecies Fishery Management Plan with Environmental Assessment, Regulatory Impact Review, Environmental Impact Statement, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 300 pages plus 5 appendices. Available at http://www.nefmc.org/groundfish/index.html

NEFSC FSB (Northeast Fisheries Science Center, Fisheries Statistics Branch). 2011. Northeast

Fisheries Observer Program: Incidental Take Reports. Omnibus data request + supplemental data for 2010 from http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html.

Northeast Fisheries Science Center (NEFSC). 2010. 50th Northeast Regional Stock Assessment Workshop (50th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-09; 57 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at:http://www.nefsc.noaa.gov/nefsc/publications/

Northeast Fisheries Science Center (NEFSC). 2014. 59th Northeast Regional Stock Assessment Workshop (59th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-09; 782 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/publications/crd/crd1409/

Oliver, M.J., M. W. Breece, D. A. Fox, D. E. Haulsee, J. T. Kohut, J. Manderson, and T. Savoy. 2013. Shrinking the Haystack: Using an AUV in an Integrated Ocean Observatory to Map Atlantic Sturgeon in the Coastal Ocean. Fisheries 38(5): 210-216.

O'Leary, S.J., K. J. Dunton, T. L. King, M. G. Frisk, and D.D. Chapman. 2014. Genetic diversity and effective size of Atlantic sturgeon, *Acipenser oxyrhinchus oxyrhinchus,* river spawning populations estimated from the microsatellite genotypes of marine-captured juveniles. Conserv Genet: DOI 10.1007/s10592-014-0609-9; ISSN 1566-0621.

Reddin, D.G. 1985. Atlantic salmon (*Salmo salar*) on and east of the Grand Bank. J. Northwest Atl. Fish. Soc. 6(2):157-164.

Reddin, D.G and P.B. Short. 1991. Postsmolt Atlantic salmon (*Salmo salar*) in the Labrador Sea. Can. J. Fish Aquat. Sci. 48:2-6.

Reddin, D.G and K.D. Friedland. 1993. Marine environmental factors influencing the movement and survival of Atlantic salmon. 4th Int. Atlantic Salmon Symposium. St. Andrews, N.B. Canada.

Sasso, C.R., and S.P. Epperly. 2006. Seasonal sea turtle mortality risk from forced submergence in bottom trawls. Fisheries Research 81:86-88.

Savoy, T., and D. Pacileo. 2003. Movements and important habitats of subadult Atlantic sturgeon in Connecticut waters. Transactions of the American Fisheries Society. 132: 1-8.

Sheehan, T.F., D.G. Reddin, G. Chaput and M.D. Renkawitz. 2012. SALSEA North America: A pelagic ecosystem survey targeting Atlantic salmon in the Northwest Atlantic. ICES Journal of Marine Science, doi:10.1093/icesjms/fss052.

Sherman, K., N.A. Jaworski, T.J. Smayda, editors. 1996. The northeast shelf ecosystem – assessment, sustainability, and management. Cambridge, MA.: Blackwell Science, 564 p.

Shoop, C.R., and R.D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs 6:43-67.

Smolowitz, R., H. Haas, H.O. Milliken, M. Weeks and E. Matzen. 2010. Using Sea Turtle Carcasses to Assess the Conservation Potential of a Turtle Excluder Dredge. North American Journal of Fisheries Management 30:993-1000.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004a. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transactions of the American Fisheries Society 133: 527-537.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004b. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States. North American Journal of Fisheries Management 24: 171-183.

Stevenson, D., L. Chiarella, D. Stephan, R. Reid, K. Wilhelm, J. McCarthy, and M. Pentony. 2004. Characterization of the fishing practices and marine benthic ecosystems of the northeast U.S. shelf, and an evaluation of the potential effects of fishing on essential fish habitat. NOAA Tech. Memo. NMFS-NE-181. 179 p.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Mar. Mamm. Sci. 9: 309-315.

Timoshkin, V. P. 1968. Atlantic sturgeon (*Acipenser sturio* L.) caught at sea. Prob. Ichthyol. 8(4):598.

TEWG (Turtle Expert Working Group). 1998. An assessment of the Kemp's ridley (Lepidochelys kempii) and loggerhead (Caretta caretta) sea turtle populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409:1-96.

TEWG (Turtle Expert Working Group). 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-444:1-115.

TEWG (Turtle Expert Working Group). 2007. An assessment of the leatherback turtle population in the Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-555:1-116.

TEWG (Turtle Expert Working Group). 2009. An assessment of the loggerhead turtle population in the Western North Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-575:1-131.

U.S. Atlantic Salmon Assessment Committee (USASAC). Annual reports 2001 through 2012. Annual Report of the U.S. Atlantic Salmon Assessment Committee.

Vanclay, F. (2002). Conceptualizing social impacts. *Environmental Impact Assessment Review*, 22(3), 183-211.

Vu, E., D. Risch, C. Clark, S. Gaylord, L. Hatch, M. Thompson, D. Wiley, and S. Van Parijs. 2012. Humpback whale song occurs extensively on feeding grounds in the western North Atlantic Ocean. Aq. Biol.14(2):175–183.

Waldman, J.R., J.T. Hart, and I.I. Wirgin. 1996. Stock composition of the New York Bight Atlantic sturgeon fishery based on analysis of mitochondrial DNA. Transactions of the American Fisheries Society 125: 364-371.

Waldman, J.R., T. King, T. Savoy, L. Maceda, C. Grunwald, and I. Wirgin. 2013. Stock Origins of Subadult and Adult Atlantic Sturgeon, *Acipenser oxyrinchus*, in a Non-natal Estuary, Long Island Sound. Estuaries and Coasts 36:257‑267.

Wallace, B.P., Heppell, S.S., Lewison, R.L., Kelez, S., Crowder, L.B. 2008. Impacts of fisheries bycatch on loggerhead turtles worldwide inferred from reproductive value analyses. J. App. Ecol. 45, 1076-1085.

Warden, M.L. 2011a. Modeling loggerhead sea turtle (*Caretta caretta*) interactions with US Mid-Atlantic bottom trawl gear for fish and scallops, 2005–2008. Biological Conservation 144: 2202–2212.

Warden, M.L. 2011b. Proration of loggerhead sea turtle (*Caretta caretta*) interactions in US Mid-Atlantic bottom otter trawls for fish and scallops, 2005-2008, by managed species landed. NEFSC Reference Document 11-04; 8 pp. http://www.nefsc.noaa.gov/publications/crd/.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, editors. 2010. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments—2010. NOAA Tech Memo NMFS-NE-219. 606 pp.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, editors. 2014. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments—2013. NOAA Tech Memo NMFS-NE-228. 475 pp.

Whitehead, H. 2002. Estimates of the Current Global Population Size and Historical Trajectory for Sperm Whales. Mar. Ecol. Prog. Ser. 242: 295-304.

Wirgin, I., L. Maceda, J.R. Waldman, S. Wehrell, M. Dadswell, and T. King. 2012. Stock origin

of migratory Atlantic sturgeon in the Minas Basin, Inner Bay of Fundy, Canada, determined by microsatellite and mitochondrial DNA analyses.

9.0 INDEX